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INFOREX

NEWS IN BRIEF

University successes

A COMBINED computing science and electrical engineering course at Newcastle University has had early successes in industry. Five graduates have begun designing microcomputer systems within days of taking jobs with GEC, Marconi Avionics and Texas Instruments.

Each student on the course gets his own basic microcomputer, assembled in a frame which includes Motorola 6800 chip, memory, power supply and 16 circuit-board slots for the circuitry. Although only about a dozen students sign up for the three-year course each year, there is room for plenty more.

Modcomp planners

LONG-RANGE planning at minicomputer manufacturer, Modcomp, is to be the responsibility of John Lobb, the retiring chairman of telecommunications equipment manufacturer Northern Telecom. Lobb is already a director of Modcomp and on October 3 takes over as chairman of the executive committee of the Modcomp board. Kenneth Harple stays as chairman of the Modcomp board and president of the company.

Retrial plea

FOLLOWING the successful bid by Greyhound Leasing for a retrial of its 1972 anti-trust complaint against IBM (CW, August 25), Calcomp has asked the same US Court of Appeal in San Francisco for a retrial of its own anti-IBM case. This was dismissed in the Los Angeles district court in February.

CAD engineers' pay dispute settled

PAY negotiations are under way between Dunlop and TASS, the white-collar section of the AUEW, following demands for recognition of new skills needed by design engineers using computer-aided design equipment.

This follows a six-week strike by design engineers at the Joseph Lucas company after the introduction of CAD equipment at its aerospace division in Birmingham in mid-1976.

TASS has negotiated with Lucas since then and the dispute has been settled by the company offering to pay a lump sum of £200 back pay and an extra £4 a week following regrading of the men.

TASS says that it will use the settlement as an aid to further discussions with Lucas on the expansion of CAD in the company.

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Salaries of new entrants up 25%

SALARIES for new entrants into the computer industry are up to 25% higher than last year, according to a survey carried out by Control Data Institute.

The survey, taken among trainees leaving the Institute, shows that the average salary for entrant level programmers made the biggest jump, overtaking the computer engineers' grade in the rate of salary growth.

Trained programmers leaving CDI have started work at salaries between £2,675 and £2,900. The average for the 54 programmers who form the sample is £2,768. This represents a 25% rise in salary over the same period last year.

As the survey is taken quarterly, it also shows that the jump is a recent event. An increase of nearly 9% was recorded between the first and second quarters this year. The increase between the final quarter of last year and the first quarter this year, barely crept over 1%.

As a further historical note, the growth between the first and second quarters last year was negative — a reduction of nearly 4% was recorded.

Computer engineers remain the best paid new entrants to the industry. The lowest salary gained by the 36 trainees leaving CDI was £2,900, while the highest managed £3,379. The average, at £3,074, showed a growth of 13% over the year. The quarterly growth rate between first and second quarters this year was just under 3%, a similar growth being recorded for the previous quarter.

Ray Fell for CW Ball

Popular television and radio comedian Ray Fell has been booked for the cabaret spot at the Computer Weekly Charity Ball on October 14 at London's Royal Lancaster Hotel.

And Ray Fell's spot will be just part of the computer industry's big night out, with a four-course dinner and dancing until 2 am.

The aim is to equal the £1,000 raised by last year's ball. Like last year, the proceeds will go to the British Computer Society's specialist group for the disabled to support the development of a special terminal.

Tickets cost £12. Send your order to Tony Higgins, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU.

AGB buys Telex bureau

AFTER three years in the bureau business in the UK, Telex is to sell its operation to one of its major customers, the AGB research group, and concentrate solely on selling IBM-compatible products and the System 32 small business computer.

AGB Research, which expects to be Europe's leading television research company, already owns two bureau subsidiaries in London, Tempo Computer Services, which has an IBM 360/30, and AGB Computer Services Division, which runs a Honeywell 3200 and a Digital Equipment PDP-11.

Telex Computer Services' IBM 360/50 (CW, October 18) will go to Tempo is to move its machines to join with the Telex machines. Telex staff will be kept on.

UCS services offered in UK via Tymnet link

FINANCIAL planning and database services provided by the big US bureau, United Computing Systems of Kansas City, are now available to time sharing users in the UK via the Post Office's transatlantic link to Tymnet, the US common carrier (CW, January 13).

UCS runs a complex of six big CDC mainframes at Kansas City and its UK subsidiary, London United Computing Systems, LUCS, formerly known as London University Computing Services which it acquired early this year (CW, January 20) runs some big batch engineering packages from UCS locally on its CDC 6500.

The time sharing services now available via Tymnet will complement these and will provide 10 chps and 30 chps access to a range of database systems including System 2000, Total and Minidata, a small scale system developed by UCS itself.

Users can also access Foresight, a financial modelling package.

All these are already available to UCS customers in the US via the bureau's own private network, Uninet, which has been linked into Tymnet especially for the UK service.

UCS says that agreements with other European PTTs having similar contracts with Tymnet as the UK Post Office, could be negotiated fairly soon and that this could be the prelude to acquiring bureau subsidiaries on the Continent.

Charges to UK users of the time sharing service will include £6 an hour for use of the Tymnet transatlantic link via the Post Office node in London and a processing charge for the use of the UCS systems in Kansus City.

'DEC has grown too big'

WORLD leader in the minicomputer market, Digital Equipment, has lost a UK customer because, says the customer, the company has become too big and inflexible.

The customer, H. Greenberg, a Manchester-based manufacturer of sewing thread, has upgraded its computing facilities by moving from a DEC PDP-8A (CW, August 25) to a model 300 from Prime Computer.

Greenberg's managing director, Geoffrey Greenberg, said his company had considered a bigger DEC machine but found the company's range of disc drives was not suitable for a gradual growth. There was a big gap between the small capacity and the large discs.

In addition, Greenberg [illegible] at DEC packages but found them too inflexible for the company's use. And, said Greenberg, the PDP-11 RSTS operating system was too much batch oriented, and the company wanted to keep with Fortran.

The Prime 300, due to be installed in November, will have up to 32 terminals. Greenberg is taking advantage of the extra power to start a computer bureau service and a bureau service offering order processing, costing and quality control systems to its customers in the textile trade.

RAF tests completed

ACCEPTANCE tests on the ICL 2980 at the RAF pay and records centre at Innsworth, near Gloucester, have been completed by the Central Computer Agency. The 2970 it is replacing at Innsworth is being transferred later this month to the Southern Water Authority computer centre at Brighton.

The 2970 will replace two ICL 1900 machines there — a 32K 1902A and a 112K 1902T.

Southern Water is one of four water authorities that have decided not to support a National Water Council plan for a central computer system to service all authorities in England and Wales. The other three, the North West, Yorkshire and Severn Trent all have ICL 1900s.

Growth of PO monopoly

● From front page

where users switch from a good line to a poor one and find that the equalisation on the modem has not adapted to the changed line quality.

The question of possible union action is brought into sharp focus by a dispute in the City of London where some members of the Post Office Engineering Union are refusing to connect privately-acquired modems to leased lines.

A Post Office spokesman said that discussions to end the dispute were continuing with the engineers and they apologised for inconvenience caused.

A spokesman for the union told Computer Weekly that the action by members of the London City branch was unofficial. "We believe it is in connection with demands for a 35-hour week, opposed by the branch, and adopted at the union's annual meeting. But we are not certain, and we have sent someone down to find out."

Unofficial or not, the dispute highlights the way in which an extension of the Post Office monopoly could open the door to similar union actions which force users to install inappropriate equipment.

"Unless the Post Office monopoly of attachments and use of information is broken, the Corporation will, for the best commercial reasons, nevertheless become a Big Brother," commented consultant Iann Barron.

"What happens when the Post Office introduces a terminal for use on the telephone network with the Viewdata service? That would take them right into the terminal business, and under present rules would lock out most of today's computer terminal suppliers."

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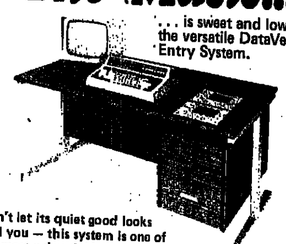
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Briefing

BCS library moves to the IEE

THE British Computer Society's library is being moved from London's City University to the Institution of Electrical Engineers. The BCS will pay the IEE an annual service fee of about £4,000. BCS members will have free access to the IEE's 30,000-volume library and IEE members will be able to use the BCS' 4,000 books.

The move from City University was brought on when the BCS cut its library budget from £10,000 to £4,000, which was not enough to buy books and pay staff salaries.

$2.7m damages

DAMAGES of $2.7 million have been awarded against IBM by a San Francisco court in favour of computer parts manufacturer Forro Precision Inc. IBM is said to have tried to destroy Forro's business by seizing confidential pricing information and blueprints in June 1973. IBM chairman Frank Cary said that this was related to a search of Forro's premises by the police with respect to IBM trade secrets. He added that IBM intended to appeal.

Merger talks off

MERGER talks between Honeywell and Siliconix have been called off following disagreement between the three main Siliconix shareholders. Honeywell has bid $20,9 million (£12 million) for the Santa Clara, California-based semiconductor manufacturer (CW, September 15).

EMS to diversify

STAFF recruitment agency EMS Consultants is to diversify. "We are particularly interested in acquiring companies involved in development of software packages, and in bureaux running on ICL or Honeywell hardware," EMS managing director John Wood told Computer Weekly.

3033 production

SPECULATION from Australia and the US that IBM intends to end production of the 3033 processor after 800, seems to be belied by the fact that worldwide orders stand at over 2,000, and the company is still taking orders for the machine.

Scicon contract

CONTRACT to provide models of a computerised field artillery system has been placed by Marconi Space and Defence Systems with Scicon. The work for the Ministry of Defence's Project BATES, Battlefield Artillery Target Engagement System, and requires the development of two models, one to simulate individual command and control position, and the other for the whole command and control system.

US chief Joffe tells 'Why I like Insac ideas'

THE newly-appointed president of Insac Inc, Seymour Joffe (CW, September 15), intends to lose no time in establishing the US base for the NEB's software export subsidiary. Last Monday, a week after his official appointment, he left for New York to begin setting up the company's office.

Joffe's background demonstrates an impressive range of marketing and managerial successes. As a regional marketing manager for Univac, he was responsible for some of the company's biggest orders, including the NASA system. Subsequently, he set up UCC's Datran communications subsidiary, and was a vice-president of Graphics Sciences, later to become one of Burroughs' rare acquisitions.

The Insac post will be his first experience of working for a government-backed organisation, and he feels it will be an interesting challenge.

He is filled with enthusiasm for the Insac concept. "It's geared towards helping companies without seeking to control them. It's an original idea, and I like it".

This policy, Joffe added, made Insac a radically different proposition from existing nationalised ventures, some of which had acquired a bad reputation among the public. Equating the two approaches might have led to some public lack of enthusiasm for the Insac idea, he admitted, but this was clearly a mistaken attitude.

Among established and prospective members of Insac, there is no lack of confidence, or of

● Turn to page 3

Seymour Joffe is pictured (left) with his two fellow Insac top executives, John Pearce (centre), architect of the Insac idea, and now full-time managing director of Insac, and Tony Chandor, who has been appointed director of business development, responsible for Insac's new ventures outside the US.

Big OCR orders at BR and Giro

MILLIONS of pounds worth of some of the most advanced data capture equipment in the world is being installed by two major public corporations, the Post Office and British Rail.

The Post Office National Giro centre at Bootle, already one of the biggest OCR users in Europe, has placed an order worth £2.7 million with the US-based manufacturer, Lundy Farrington, for a radically new type of OCR system that will handle both capture and ledgering of data on millions of Giro cheques and transfer forms.

In addition, the firm that supplied the existing Giro OCR and document sorting equipment, Recognition Equipment, has been awarded a £1 million contract to supply TRACE systems to sort the cheques and transfer forms. TRACE, Transaction Control and Encoding, is used by numerous banking organisations in the US and Europe.

Meanwhile, British Rail is to place major orders with Redifon Computers for seven mixed key-to-disc and OCR systems to handle data capture at sites around the country. A pilot system is already in operation at Dorking, Surrey, capturing data from car ferry and international rail tickets. Each Redifon system will include an Input 80 page reader supplied by Recognition Equipment.

The installation of these systems is expected to result in considerable changes in the staffing and operational procedures in both organisations.

The Lundy Farrington system for the Giro will go operational in 1979 and will replace Recognition Equipment document readers installed in 1967 (CW, March 3, 1967). It will be the first large-scale system of its kind to be installed anywhere in the world and will involve a hierarchy of processors linked to OCR terminals called Lundy Operator Terminals, LOT.

There will be 154 LOTs in the Giro system, each able to handle in one pass functions that are at present dealt with by several pieces of equipment. They will read multi-fount alphanumeric information from Giro cheques and input documents and perform an add listing function. If handwritten data, such as a money amount, is encountered the document transport will stop to allow the operator to encode it. The operator will also inspect and re-enter rejected characters.

According to Lundy-Farrington this will eliminate the reconciliation problems caused by the batches of documents with rejects accumulated by conventional document readers.

The documents will then go

● Turn to page 25

French threat to CII-HB

THE French Socialist Party has announced that it intends to nationalise the country's only mainframe manufacturer, CII-Honeywell Bull, if the "Left Alliance" wins the General Election next March. Its main partner in the Alliance, the Communist Party, has only proposed nationalisation of Compagnie des Machines Bull, which holds 53% of the CII-HB equity.

The most recent opinion poll showed the ruling alliance of Prime Minster Barré trailing the Left Alliance, but a majority nevertheless expected the government to retain power.

CII-HB had no comment on the statement from the Socialists, but company president Jean-Pierre Brulé said recently that the company was working towards its 1980 objectives to ensure that whatever its future, it would remain in a healthy state.

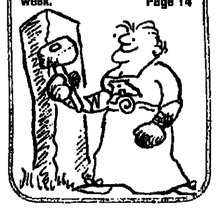
NEW THIS WEEK!

Computer chess

Another important new feature, Chesslab, begins this week in Computer Weekly. Professor Donald Michie, one of the world's leading experts on machine intelligence, will be conducting Chesslab which will examine the theory behind computer chess as well as looking at particular games and examples. The first Chesslab reports in detail on the World Computer Chess tournament held last month in Toronto Page 4

The Liveware Saga

Our regular Liveware cartoon takes on a new dimension this week. Page 14



Indian holdings cut

DISCUSSIONS are under way between ICL and the Indian government which are expected to lead to ICL merging its Indian marketing and manufacturing companies, and reducing its holding in the merged company to 40%.

Meanwhile, in a statement on its position in India, IBM says that it understands that it will only be allowed to do business in India if it reduces its total holdings in its operations there to 40%.

"We are still hopeful that the government will accept our proposals for 40% ownership in our manufacturing and marketing operations, and not force us to leave India," says the company. IBM India has 800 employees.

COMPUTER WEEKLY'S INSIDE NEWS

China chances

China is opening up the Bamboo Curtain to technology and presenting a vast potential market to world manufacturers. Nick Bark, of Interdata, who was a guest of the Chinese government earlier this year, comments on the prospects for computers Page 5

Fair questions

How will new technologies affect end users? Will the DP manager's role change as computing converges with communications? How should the government help end users? These will be some of the questions discussed at Datafair. Get a foretaste in our preview: Page 28

Modcomp plans

In mid-1976 Modular Computer Systems ran into serious financial trouble caused mainly by its rapid growth. Now the company is profitable again and its moves to stay that way have included the appointment of a general manager, John Pitt, to supervise all aspects of its European operations. He tells Keith Jones of some of his plans for the company. Page 30

Secure service

Continuing his outline of a public key cryptography service, Donald Davies describes the techniques that can provide the security that is essential for the transmission of sensitive data Page 31

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COMPUTERVIEW

Unemployment death by a thousand cuts

COMPUTER technology is contributing to unemployment levels and will continue to do so at an increasing rate. The only real question now is how advanced industrial societies will cope with the effects of the ability to produce more wealth using less labour.

That might seem like an alarmist statement, unjustified by any concrete evidence. And to some extent it is just that.

It is meant to be alarmist because, like any alarm systems, it is meant to help stimulate action that will help stave off some impending unwelcome act.

It is not backed by any comprehensive research study into the effects of information technology developments on employment levels, because Computer Weekly knows of no such comprehensive survey.

But we are aware, day in and day out, of computer systems that are being implemented which either eliminate existing jobs or reduce the number of jobs in the future.

However, few companies like to announce, "Our computer has saved us x staff" because there is a fear of what the union reaction might be.

It is a case of a creeping death of a thousand small cuts.

In the Observer recently, the distinguished financial columnist C. Gordon Tether examined the problems of the impact of new technologies on employment levels in an article headed "Ideas that put the world out of work".

Tether questions the remark made in a speech by Lord Houghton, former chairman of the Parliamentary Labour Party, suggesting that the answer to the unemployment problem lay in "boosting industry and technology by all possible means".

Pointing out that most governments now recognise that the steep rise in unemployment in the 1970s is due to "structural changes" beyond the transitory effects of waxing and waning business cycles, Tether comments:

"There is increasing awareness that, foremost among the factors that have led to this structural disequilibrium is the pace of technological advance — more particularly the evolution of machinery capable of producing the same output as that which it replaces with many fewer workers."

This was one of the crucial points raised at the Hedsor Park conference earlier this year, on the theme Can Computers Save Britain? (CW, July 14).

The convergence of computer, communications and semiconductor technologies will have profound effects on the nature and levels of employment.

The counter argument to fears of a threat to employment levels from technology is to suggest that increased efficiency will create an expanding economy and therefore more jobs.

But, as Tether writes, "What the experience of recent years appears to demonstrate is that it has become highly questionable whether, even where a fast rate of economic advancement can be maintained, new jobs can be created fast enough to make good the destruction of existing ones that the increasingly rapid tempo of technological progress is bringing about everywhere."

Unemployment is an emotional political issue and is usually analysed in a straight "we must bring the figures down" context.

The death by a thousand technological cuts passes unnoticed on a day-to-day basis, whereas an immediate threat to British Leyland's workforce hits the headlines.

Urgent and courageous political action, however, is needed in preparing for the impact of new technologies. Action that tries to ward off any potential anti-computer Luddite movement by planning for a future where high unemployment may be an acceptable — even desirable — objective, opening up prospects of increased leisure activities.

If that pre-emptive action does not happen, there could be a traumatic and destructive period while society learns to live with — or reject — the fruits of man's scientific and technical genius.

Ten years ago...

COMPUTER WEEKLY SEPTEMBER 21, 19[illegible]

The Minister of Technology, Anthony Wedgwood Benn, is sending a message of good wishes to a new government-backed information and research centre in Park Avenue, New York, commented Benn, is a brain drain "demonstrating a continuing sense of ennui among some of our most talented people"... In its annual report, the BCS noted that proliferation of examining bodies would hinder attempts to help the training of computer personnel... The French parliament budgeted 148 million francs, about £10.35 million, for Plan Calcul, its mini-computer plan. CII was to have 56% of this... ICT applied for a licence to build a factory in Czechoslovakia to produce its 1901s. Bull-GE of France is to put up a similar proposal... The death of Leo Electric's System 4/10 has left with no basis for a tenable... larger systems... Olivetti launched a major attack on the terminal market with the 100 based on the Adder... counting machine, the ET 101, a teleprinter-style terminal, the TCV 250 CRT unit, and the 40 serial printer.

FOCUS

. . . on being taken to the cleaners

ONE of the most neglected areas in computing is site cleaning maintenance.

Being logged in the non-glamorous activity league, cleaning seldom receives the due care and attention of computer management.

Establishing good cleaning relations is difficult. Few members of DP management are around when the work is done (or perhaps not done).

So the news that an organisation known as The National Computer Complex Cleaning Committee (CW, September 15) is running a cleaning workshop next month, could well be the dramatic breakthrough the industry has been awaiting. Although this particular seminar is designed specifically for those managers who have an overall responsibility for cleaning and those who actually do the job, it is open to all with an interest in installation cleaning.

Clearly the opportunity of meeting those responsible for cleaning activities should not be missed.

DP professionals could take the opportunity of mentioning the inadvisability of scrubbing down the disc drives with soapy detergent. Rubbing down the CPU with abrasive cleaners similarly is unhelpful. Using disc-packs as door-stops while the suction cleaner is in operation also needs discouraging.

The facts of DP cleaning life are often staggering. Contract cleaners, possibly hired by the hour, make a determined assault on the installation floor. As a result, not only does the computer room trolley become unmanageable, but the operations manager staggers on the highly-polished floor; or the cleaning team regards the equipment as a lethal adjunct to a reptile house.

Considering that the computing installation resources involved could exceed £1m in value the indifference to cleaning standards is surprising. The DP operation could be at the mercy of a team of heavy-handed cleaning operatives. Establishing firm installation cleaning commandments should be an essential role of DP management — one not to be left under the worn computer room floor panels.

Maybe DPMs should attend the seminar. Being taken to the cleaners could well be a rewarding experience.

INTERRUPT...

THERE was once a highly skilled and competent systems programmer. He had a very small computer (a 12-bit mini), but very ingenious ideas. It wasn't long before his small computer was doing time sharing, graphics and a host of advanced functions.

One day, realising that one thing he had not made the computer do was to give a long string of commands to itself while he had a (much needed) good night's rest, he set to and wrote an executive facility to allow a privileged user program to LOGIN other terminals and send them a string of user defined commands — all complete with timing and branching facilities, variable input modes, etc.

He told his wife he would be home early and set his systems going to do a host of time-consuming jobs he had left hanging about for weeks.

To the sound of the teletype's clatter he locked the machine room door, heaved a sigh of the contentment born of true automation, and went home.

In the morning the area around the teletype was not the enticing mound of paper he had expected. He glanced at the machine lights: their playful flicker assured him that there was no obvious hardware failure. He approached the now silent teletype.

The end of the paper roll, still hanging by a thread to the platen, was a chewed-up mess and, as his eye took in the pink edge of the paper, he realised with a sinking feeling that he had left the teletype with an almost empty roll on which to print his night's work.

Moral: He that lends his computer wings must still attend to little things.

● Submitted by John Davidson of Graphic Display Systems, Cambridge, who receives the weekly £5 interrupt prize.

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Two firsts for Chess 4.6

COMPUTER chess scored two notable firsts at the Aronson Chess Congress at Harrow last weekend, billed as Europe's largest. The open entry of 164 players included the first appearance of a computer contestant in any European congress of this type. In addition, in an informal two-game match of five-minute chess at the end of the proceedings, Britain's Michael Stean became the first International Grandmaster to drop a game to a machine in blitz chess.

The first prize for the Open was shared by the Czech Grandmaster Hort and the young British player Peter Large, each with 8½ points. The computer program Chess 4.6 lost one game, won two and drew three, accumulating a final score of 3½ points.

The sole defeat occurred in the first round at the hands of Lan Perry, a player rated considerably weaker than Chess 4.6 which enjoys "expert" status. The upset was instructive. On move 13 the program launched an ingenious four-move combination which snatched a pawn, but paid the price of having its marauding knight permanently immobilised in a far corner. The program does not have the concept "temporarily safe but trapped" in its repertoire.

A contributing factor in Chess 4.6's success was the psychological effect, even on strong players, of facing a machine for the first time. Chess 4.6's third-round opponent T. Lewin, who once played first board for Oxford, was startled by the program's habit of calculating during its opponent's thinking time so as to concoct a reply to the human's predicted move, ready for instant release.

"It's very unnerving," he commented afterwards.

Chess 4.6 is the reigning world champion in computer-against-computer chess. It was developed by Larry Atkin and David Slate at Northwestern University, US.

DONALD MICHIE

● Chesslab: page 4.

Fresh attack on ICL's levy policy

THE ICL levy and marketing policies have come under further attack. Complaints have been sent to the Office of Fair Trading by the Central Computer Agency, the office through which all Government computer equipment is ordered, and by plug-compatible systems house, Teknos Systems of Uckfield, Sussex.

Teknos has introduced two disc subsystems which are aimed at ICL 1900 users put off by the cost and performance of the EDS 200 (CW, September 8). The systems, DSS 62 and DSS 64, are said to provide two and four logical EDS 60 drives per spindle respectively, at 50% less than the ICL equivalent.

The Teknos complaint to the OFT is about ICL's compensatory levy which is demanded from users installing add-on memory or peripherals from an independent supplier — or OEM attachments as ICL calls them. The levy is normally 20% of the monthly rental ICL would have received if the user had chosen ICL kit.

The CCA has complained to the OFT about the levy policy, mainly because it can affect ICL government users as well as private concerns.

Several users have challenged ICL's levy policy, including Bradford Metropolitan Council and Norwich Union (CW, June 2), but the CCA and Teknos are the first to take the matter to the OFT. However, the office is already dealing with complaints about servicing policy (CW, June 23).

In the first full issue of the ICL Computer Users' Association quarterly journal, User News, due out at the end of October, users will be asked to submit their views on the levy policy. The matter is discussed in an article on the subject by the chairman of the Standing Committee on Policy and Pricing, Ian Gregory of Smiths Industries.

The aim is to find out how many users feel they are adversely affected by the policy and in what ways, and what the implications are for the future.

The results will probably be given to ICL for its comments and could result in the user conference on the subject, originally planned for this month (CW, July 21), being held in the New Year.

The DSS 62 and DSS 64 plug compatible disc subsystems from Teknos use Calcomp drives which are normally used as IBM 3330 compatible units with 100 or 200 Megabytes per spindle. The Teknos systems reformat each spindle to look like two or four EDS 60s, with overall capacities of 120 or 240 Megabytes.

They are linked to an ICL 1900 via a controller based on the Digico Micro 16E minicomputer and are fully supported by standard ICL EDS 60 executive and operational software.

Teknos says that the DSS 62 and DSS 64 provide reductions of 33% in latency and 14% in average seek time over the EDS 60, although write operations can be slower, depending on the number of logical records to be written.

The systems come with two spindles per cabinet and Teknos quotes £59,000 for a complete DSS 64 system with a controller and two spindles holding a total of 480 Megabytes.

TELETYPE-compatible Vitel VDUs from ATS Communications of Haywards Heath are being installed in place of teleprinters throughout the BBC's internal communications network and a BBC sub-editor is pictured here dictating a news bulletin to a telegraph operator. More than 100 of the VDUs, worth £250,000 in total, are to be installed. The displays will be used for assembly of news bulletins, Press announcements and programme schedules for the regions. The BBC's message switching systems include an ITT 6400 ADX system for the overseas service, and a system from Unit Automation of Tenterden, Kent, based on a Digital Equipment PDP-8/L mini (CW, October 28, 1976).

GEC policy on union recognition

A MAJORITY decision by employees on whether to be represented by a particular trade union will be recognised by GEC, said Lord Nelson, chairman of the company, at the annual meeting of GEC.

He was replying to a question from John Sampson, general secretary of the United Kingdom Association of Professional Engineers.

This follows limited recruitment of professional engineers at GEC, following management statements that UKAPE cannot and will not be recognised.

"This misunderstanding has now been cleared up by the very statesmanlike and honourable declaration of policy by Lord Nelson," said Sampson.

Micro-controlled tape recorder launched

AN integral microprocessor enables the Model 101 portable instrumentation tape recorder announced by Honeywell to be calibrated without expensive external test equipment.

Honeywell says that the microprocessor also enables the user to verify calibrations and to program specific sections of the tape for replay. It also allows the sequence of tape tracks used to be programmed.

Supplied by the Honeywell Test Instruments Division, the Model 101 is a large reel unit providing from seven to 32 recording tracks.

Honeywell says it is the first portable instrumentation tape recorder controlled by a micro.

PO asked to take over all private maintenance

A SETTLEMENT involving the Post Office taking over maintenance of privately-acquired data equipment such as modems and teleprinters is being sought in the dispute initiated by members of the London City Branch of the Post Office Engineering Union.

Branch members are refusing to connect privately-acquired equipment to Post Office lines (CW, September 15). The immediate impasse is being resolved by the Post Office buying the equipment involved and taking over maintenance, but the union is seeking a permanent change in the rules.

"A meeting between the POEU, the London Branch and the Post Office will be held on October 14 to try to resolve the problem," a union spokesman told Computer Weekly. "We believe the suppliers would probably welcome the Post Office taking over maintenance."

A spokesman for Case said that the company would be happy to have the Post Office take over maintenance, adding that the company was in business to sell equipment and made little money in maintenance. No one at Racal-Milgo was available for comment.

'Why I like Insac ideas'

● From front page

ideas. In his prolonged talks with these companies, they had put forward "some very good ideas, which will prove highly saleable in the US".

"Contrary to another popular opinion," he added, "UK people are prepared to work hard, and UK programmers really know how to write good software".

Joffe does not, however, see a large volume of sales as Insac's only benefit. "Our first task is to establish credibility. Once we have shown ourselves to be a credible organisation with good backing, people will talk to us freely, and this could result in more front-line technology being brought into the UK."

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GILB'S MYTHODOLOGY

Guaranteeing program maintainability

DO you know how to write a systems specification, or a contract guarantee which will help you be sure that the resulting programs are really easy to modify and understand once they have gone into the operational phase?

Some people fool themselves that they know how. They write specifications like "Standard Cobol," "Structured Programming" and "Small Modules." Probably these things do contribute to a certain degree to ease of program maintenance. But they do not guarantee any known level of maintainability.

The system can be delivered to the software house or your own people, it can formally meet your specifications, and it can be much more difficult for your maintenance programmers to find their way around in than you had hoped.

What we need is a way of motivating the program producer, and the program designer, to create a specific level of ease of understanding the program. From our point of view, it should not really matter *how* this is achieved, the important thing is *that* it is achieved.

There are many different techniques for increasing the maintainability of a program, and a lot of them are much more effective than the three techniques mentioned above. We should not therefore limit our suppliers by constraining them to a specific set of techniques, because we then become the ones responsible for lack of sufficient maintainability.

Let's learn to judge by results, not by techniques.

The practical technique which we use to measure a degree of maintainability is called the "bebugging" technique. Various other terms are used such as artificial bug insertion, which is close to the concept of artificial insemination.

This technique has been used extensively by researchers such as Gould and Drongowski of IBM, to study debugging behaviour. It measures the effect of various people and various program documentation levels on the work of identifying bugs.

Learning from these experiments I have for the past two years made use of the following system and contract specification in a variety of applications:

The program maintainability shall be at least 90 per cent probability (in ½ hour) for the assigned and trained maintenance programmer to identify (without fixing and retesting) undesirable program results ("bugs"). A practical test for system acceptance may be carried out by insertion of at least ten artificial program bugs at random by an independent party, one at a time. The qualified maintenance programmers must demonstrate that they can correctly identify the statements causing the bug in at least nine out of ten cases within a time limit of under one half-hour ("each," or "on average," depending on how lenient you are feeling that day).

In one case, a Scandinavian bank online system, the contracts were already written, and the only specification for the supplier of the 180 intelligent cashier machines, and their programs to be supplied, was that the bank's people "should be able to maintain the programs."

We got agreement immediately from the supplier to an acceptance test based on the above formulation. At first he was sceptical, until I pointed out that such a formulation actually *limited* his responsibility to the bank. His other objection was, "How can I know if my programmers are making high enough quality programs until it is all finished?" To which the reply was: perform the test on the first module (of 200 planned). If you pass it, you are on the right track; if not, you have an opportunity to change your programming methods and documentation methods.

SOFTWARE FILE

EDITED BY STEPHEN BELL

Multi-threading extends Cortez

A RADICALLY new version of one of the major contenders in the competitive ICL transaction processing market has been released. The enhancements to Zeus-Hermes' Cortez TP monitor demonstrate the continual increase of TP sophistication among small-scale ICL users.

The major enhancement to Cortez is the introduction of multi-threading, the capability of processing more than one transaction simultaneously. In many installations, this is likely to improve performance considerably, since relatively fast transactions will not be held up by slower work.

The ICL 2903 series TP monitors, ETS and MTS, do not employ multi-threading, adopting an entirely different philosophy for running user program modules in a TP environment. The main independent competitor for Cortez, the Telecomputing TPS, already has a multi-threading capability.

A Zeus-Hermes spokesman said multi-threading for Cortez had been introduced partly in response to competition and because of requests from users.

The majority of Cortez users are still on the 2903, but the company has five 2904 users and two on small-scale 1900s. Another prospective 1900 Cortez user may, in the near future, progress to large-scale 2900s, through ICL's DME operating system. This could lead Cortez into the 2900 market.

While multi-threading will, in many cases, improve response time, it clearly carries with it a penalty in memory occupancy. Zeus-Hermes has attempted to reduce this drawback, notably by excluding multi-threading file access, which, it predicts, will seldom be required. This new version, Cortez Plus, is claimed to occupy only 500 words more than standard Cortez.

Other enhancements incorporated into Cortez Plus include file security to prevent corruption when more than one transaction attempts to update the same file. Individual records, sets of records or an entire file may be "locked" against access.

Promised interfaces for ICL 7502 and other intelligent terminals have been promised, a "device independent" terminal handling facility will be added, hard-copy printers may be attached, using the same interface as the visual display terminals.

Although Cortez was originally an Australian product, enhancements implemented in Cortez Plus have been produced entirely in the UK. Zeus-Hermes could thus find itself in a considerable advantageous position if the enhancements back up the originator, Spectrum Software of Melbourne. Definite decisions on this front have not yet begun, said a Zeus-Hermes spokesman.

Comshare, Univac in attack on inefficient materials management

LATEST recognition of the importance of efficient materials management to the manufacturing industry has come on two fronts.

Univac's formation of a special UK division for its Unis manufacturing control system has been swiftly followed by the release of a new materials management package, Boss, from the Comshare bureau.

Boss, Comshare claimed, would allow a company which manufactures by assembly or fabrication to calculate its materials requirement and regulate its stock of raw materials or components in the face of varying demand for its product and varying material supply.

The user could, from his own terminal, update stock and order information, inquire into stock status, produce standard and specialised reports, and allocate stock against known orders, said Comshare. Various production plans could also be tested, to judge their effect on stock levels and their efficiency in meeting demand.

Boss already has five users, including engineers Hick Hargreaves and Son, of Bolton, Lancs. The product was developed entirely by Comshare's UK division, initially for the UK market, but when a user base has been established marketing will extend into the US and Europe.

Together with the software, Comshare is also to provide a consultancy service to aid Boss users.

Univac UK's new division is headed by Mike Sanders (People, September 15). It will provide salesmen and support staff dedicated to Unis.

Unis is founded on a database for all information handles inventory management, production planning and scheduling and order management. It runs on Univac's Series 90/1100 systems.

Trend predictor package

ADDING to the variety of software tools on the market for predicting trends in any kind of data on the basis of past values is the SIA bureau. Known simply as Time Series Data Base, the software allows series of past data values to be stored, retrieved and amended.

SIA already markets a prediction suite known as Sybil/Runner (CW, October 21, 1976), and TSDB has been fully interfaced with this software.

Data can be entered into the TSDB database on punched cards or paper tape, or direct through a terminal. In addition to the time series values, accompanying documentation can also be stored. TSDB was originally developed by Whitelaker Computers of London.

Integrating mass with disc storage

SOFTWARE has been announced by IBM in the US to integrate its 3850 mass storage system with disc-based storage.

Known as Hierarchical Storage Manager, it automatically moves datasets to discs or cheaper, slower 3850 storage, dependent on frequency of access.

The product also provides automatic back-up copies of datasets, which are changed whenever the datasets are altered.

The product is not available yet — release is scheduled for early next year — but reaction of potential US users who have examined the specifications appears broadly favourable.

Users of the 3850 have previously had to provide data transfer and back-up manually, and the new software fulfils a widely felt need, it was acknowledged.

Hierarchical Storage Manager is designed to run under MVS and JES3, on all 370s from the 145 upwards. The software is available for the 3033, IBM confirmed. It is designed to service both batch and online users.

ANSI specification boost for Mumps

THE biggest boost to date for the interactive language Mumps was received last week, with the announcement that specifications for an ANSI standard for the language have been accepted by ANSI's DP committee, X3.

The Mumps ANSI standard was first contemplated almost exactly a year ago (CW, September 23, 1976). Final approval gives this relatively new, user-developed language a status so far achieved only by the "industry standard" languages such as Cobol, Fortran and Basic.

Mumps is designed for complex data handling in an interactive mode, and incorporates its own data management software and multi-user executive.

It was originally devised by Massachusetts General Hospital for medical information retrieval and this has remained its predominant use in the US.

In Europe, however, the language has gained a number of commercial users in varying fields, prominent installations being at ATV and Pye Records.

Its popularity was undoubtedly due mainly to its adoption by Digital Equipment, for use on the PDP-11 series. This hardware, for which Massachusetts Hospital originally designed Mumps, still accounts for the overwhelming majority of Mumps installations.

The move towards standardisation was encouraged by the beginning of Mumps implementation on other machines. Acceptance of such a standard by an internationally recognised body will doubtless further accelerate the spread of reliable implementations on to a variety of hardware.

The announcement coincided with the second European Mumps user group meeting (CW September 1). A number of non-DEC implementations of Mumps, particularly on microprocessors, were presented to the meeting.

At a meeting earlier this month, in the US, a timely announcement of a planned implementation came from Prime. A spokesman for the company said that Mumps was not a standard product on Prime's minicomputers yet, but the company "will almost certainly offer Mumps" in the near future, probably by the end of this year.

ANSI standardisation and the prospect of use of Mumps on a wider range of equipment has been, in general, well received by the growing band of Mumps users. There have, however, been some fears expressed that standardisation will mean a slowing of further development in the language.

Simulating queueing

A SOFTWARE product allowing simulation of queueing systems without having to learn a specialist language has been adopted by the London University Computing Services bureau. Originally developed at Imperial College, London, under the name Draft, it has been re-named LUCSIM in the LUCS implementation.

LUCSIM accepts a logical and numerical description of the queueing system to be simulated, and generates from this a Fortran program to perform the simulation.

Constraints on the input mean that this program will be simple in structure, but it is intended merely as a draft, to be elaborated by a Fortran programmer. The effort involved, LUCS claimed, was still a fraction of that entailed by writing a program from scratch.

PROGRAMMER NOTES

The benefits of doing some maintenance

DESPITE some doubts expressed by an IBM survey (Programmer Notes, July 21) it is still generally accepted that most programs are long-lived, and maintenance consumes a large proportion of the total programming effort, perhaps more than development in some cases.

In spite of the importance of the maintenance function, said one prominent software developer, maintenance was usually a boring occupation, and, in many installations, was handed over to the less competent programmers.

Why was this, he wondered? Was there still an inadequate appreciation of the importance and complexity of maintenance — or, to look at it negatively, of the wrecking potential of bad maintenance?

Alternatively, is there an element of reward and punishment in the apportioning of work — the good programmers get to do the interesting development jobs, while the weaker ones are "sentenced" to a period at the maintenance desk?

Far from being a punishment, our contributor suggested, maintenance work could provide valuable training, increase programmer's awareness of the bad practices which create later maintenance problems, and thus make him or her a better development programmer.

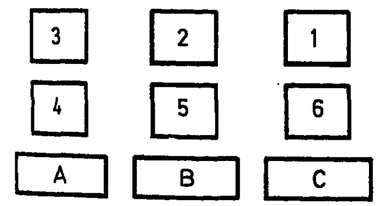
He suggested that not only could programmers spend part of their initial training period in supervised maintenance work, but that trained programmers could benefit from having their jobs "rotated" between development and maintenance programming.

How is development and maintenance work partitioned at your installation? Is there an established team of "maintenance programmers"? Does everyone maintain his or her own programs, creating the risk of unclear code written for one programmer's eyes only? Or are job functions freely rotated? Whatever technique is employed, do you think it is the best, or could it be improved?

Is there any way of reducing the maintenance load or, alternatively, of making maintenance work more interesting? Our correspondent, a marketer of packages, naturally suggests that the maintenance load can frequently be eliminated by buying a package. It would be interesting to see whether this is true in practice.

Does the "not invented here" syndrome allow DP managers to leave their packages alone, or are unfortunate programmers called on to maintain, or drastically amend, software acquired from outside?

Puzzler



THIS diagram represents six counters stacked on three bases A, B and C. So the position left-to-right can be described as

3 2 1
4 5 6

The problem is to bring about a

1 3 5
2 4 6

left-to-right position in only 15 moves.

Each "move" must consist of transferring one uppermost counter to another base — but at no time may any number rest on a lower number than itself.

For example, the first of the 15 moves could be either 2-to-A, 1-to-A or 1-to-B; but 3-to-B, 3-to-C and 2-to-C are not permitted. See page 55 for solution.

Package Programs steps into exports

WITH a successful record of bringing overseas software products to the UK, Package Programs of London, is likely to begin exporting some products of its own. The first step into the overseas market has already been taken, following the founding of an associate company in Paris.

Initially, this company will handle Package Programs' existing range of products: the MMS accounting packages, from US company Software International Corp; and the Q-Pac payroll system, from Q-Packaged Programs of South Africa.

Package Programs is, however, already recruiting for a research and development department. This move is likely to result in the production of packages in the UK for home sale and export, director Abram Azagury confirmed.

No details could be given of applications to be approached, but, presumably, the accounting-related area in which Package Programs has already established its reputation, will be high on the list.

The new company, PPL (France) SA, is to begin trading on October 1. The decision to go into France was the result of a market survey, which uncovered several good French prospects, said Mr Azagury. Ventures into other EEC countries are under consideration.

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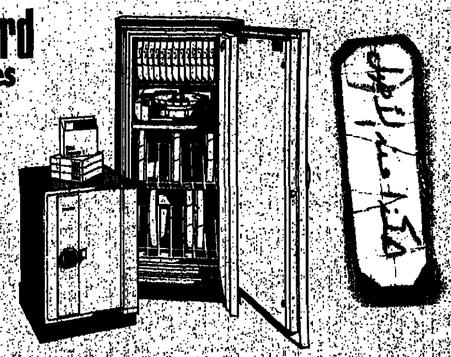

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October 6

This year, the Business Efficiency Exhibition blossoms in bright new colours as the International Business Show, to be held in Birmingham from October 11 to 20.

By bringing small business men and the office manager face to face with new computer systems, the IBS could prove to be an important landmark on the way to the much heralded "automated office."

In the October 6 issue of Computer Weekly, there will be a comprehensive preview on what is to be on show at the IBS plus specially commissioned articles looking at the needs of the automated office and of the computer environment in general.

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October 13

The biggest West German showcase devoted exclusively to computer systems and peripherals, Systems 77 takes place in Munich from October 17-21

Once again, Computer Weekly is taking a stand at the show to offer advertisers an unrivalled means of reaching the large number of high-calibre visitors to the show. During the course of the exhibition, 5,000 copies of the October 13 Computer Weekly edition including a comprehensive preview of the exhibits on offer, and a series of articles on computing in West Germany, will be distributed to visitors

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LETTERS

The guardians of the public interest...

COULD I express my complete support for your Computerview on Professor Dijkstra's outburst on microprocessors?

However, I feel strongly that it is not simply a case of accepting microprocessors because they are here. Surely the long-term objective of the true professional is to be a guardian of the public interest until such time as the ordinary man in the street can take over the "technology" as a well understood and accepted part of everyday life.

Microprocessors will clearly contribute more positively to public understanding than any other factor since the invention of the computer and must therefore be given an unequivocal welcome.

Whatever has happened so far in the history of computing, very little has been done to dispel the fear and misunderstanding of the general public and non-computer people produced by the large centralised mainframe, and its accompanying academic gobbledegook.

The microprocessor and the pocket calculator are, thank goodness, helping to correct this.

To ignore this long-term objective, is simply to establish an elite feared and necessary to survival in the technological jungle, a group of dedicated "witch doctors" full of modern mumbo-jumbo. Professionalism then begins its exploitation of the public, gradually disregarding conscience and standards to degenerate into the cult of the secure job and the good salary, simple protectionism in an insecure world.

Please let computing, the youngest profession, take a different stand even if most of us are no longer needed in the future.

Dr P. J. MARCER
Manager
South West Universities
Computer Network
University of Bristol

Indebted

YOU reported the sad tale of the destruction of our computer installation (CW, September 8). Through your paper I would like to thank the staff of the Wellcome Foundation Dartford and BOC Datasolve who helped us recover our planning systems and get them operating again with minimal interruption.

P. S. BEDINGFIELD
Planning Systems Project Manager
Bowater Scott Corp.

Shortage of staff due to lack of training

I WOULD like to comment on the letter from Mr K. Carter (CW, July 28) about the acute shortage of computer people, resulting in the high turnover of staff. The most valid reason for this shortage is lack of training, and while I agree completely with the points Mr Carter so firmly made, it must be said that 100 per cent responsibility for the current situation cannot fairly be placed on the shoulders of the educational institutions alone. A company must have an education and training programme to assist its employees' career development. Obviously to be cost effective this training programme must be co-ordinated to make it responsive both to company requirements as well as individual needs. People with a high need for advancement will leave a company unless this need is fulfilled. Emphasis on advancement, through training, increases the job satisfaction of computer staff and so encourages them not to take their new found knowledge elsewhere.

The problem is two-stage: Education to industry entry; and education and training for career and technical advancement.

The responsibility for solving it at both stages must be shared by the educational institutions and the industry as a whole. A good case for a Computer Industry Training Board has existed for many years, its where is it?

I agree with Mr Carter that computer science must be established as a major discipline in our universities but I would again emphasise the need for post-graduate education and training in computer technology. If the UK is to meet the demands for competent computer people.

SHARON ROSS
Infotech International

Plenty of literature on CAL systems

IT was interesting to read the comments of NDPCAL's assistant director, Roger Miles, on the availability of published material on computer assisted learning (CAL) systems in the US (CW, August 18). As many of your readers will be aware, there now exists a large number of student orientated computer-based teaching and learning systems in both America and Europe. Of those available within the US, perhaps the most well known are TICCIT (the Time-shared Interactive Computer Controlled Information Television from the Mitre Corporation) and, of course, PLATO from CDC.

I should like to clarify a comment which originated from Mr Miles describing the apparent scantiness of information about non-British CAL effort. The amount of literature available on and relevant to US CAI/CAL systems is quite substantial. For example, there are over 400 published reports/papers on the PLATO system alone. The first of these dates back to about April, 1961, while the most recent is probably that entitled, "Demonstration of the PLATO IV Computer Based Education System — Final Report for the Period 1/1/72 through 30/6/76." This latest report (375 pages) was published in March, 1977, and described PLATO's major achievements and internal evaluation. In addition, several of the many applications are described; the teaching of elementary reading, elementary mathematics, university physics and university chemistry. Some of the published reports deal with the cost effectiveness of PLATO and its teaching techniques that it uses.

There are many additional reports that describe other CAL systems located in either the US or Europe (for example, those in France and Germany). Given that there exists a wealth of information about CAL, how can NDPCAL claim that "there is very little published material on US systems?" Such an unawareness certainly reflects the need for setting up a national information centre on CAL. Let us hope, however, that the proposed centre will look beyond the horizons of the orthodox and somewhat insular NDPCAL organisation. Any attempt to broaden the terms of reference of such a centre would thus give educators the opportunity of learning more about the progress being made by workers in other countries within this very important area.

P. G. BARKER
Middlesbrough

Care of equipment

I WOULD agree with all that Mr Richard Evans says in his article (CW, August 25) and would like to support his comments with some of my own. My comments are formed from a hardware engineering background, and I aim them directly at the computer manufacturer independent service companies, and users. While it is true that the staff of computer users need training in points A B C D with regard to media, they also need training in the care of the equipment that handles that media.

In the time that I have been in the computer industry I have seen great importance placed on what was called operator maintenance. This graduated to daily housekeeping but meant the same thing. It was applied in the data prep area, as well as the computer room. Then as more computer manufacturers started to evolve, and compete for sales, the need for operator maintenance, though still there, was never mentioned.

As long as you have moving mechnical parts, moving stationery, moving magnetic tape, moving discs, the need will remain. Tape drive heads and transport area need to be cleaned, paper dust removed from line printers, card dust from card readers and so on. Ask any operator how many times he cleans the stylus on his stereo record player or the head of his cassette player. It's not that they don't know. I think that some computer users believed, or worse, just wanted to believe, that this maintenance was not necessary in order to gain more online time. In some cases it has just slid out of the list of daily chores. There may well be other factors which have helped to bring about the general fall in standards in this area over the last ten years.

What needs to be done now and the lead must come from the manufacturer, and the independent maintenance company, is to reintroduce operator maintenance as an important part of the daily routine of running a computer system — both the maintenance of media, and the maintenance of the hardware. If this were done they would find that not only would the user achieve a higher serviceability ratio, that their service departments would experience a drop in fault calls. This would improve the service department's efficiency.

It would do us all computer good if they were to appoint an engineer to attend to this aspect of their products. He should be briefed to write procedures, provide training and to monitor continually the effects in the field, making changes where necessary, to keep this area of maintenance in line with the continuous development of peripherals.

Harrogate

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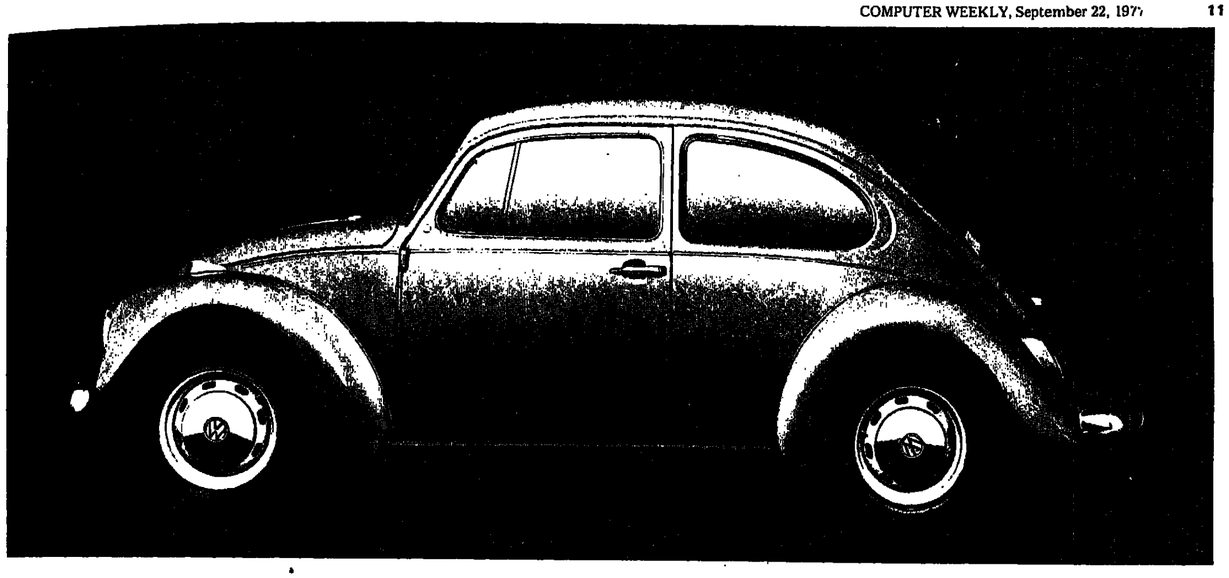

How Nixdorf help to keep the most reliable car in the world on the road.

Imagine for a moment that you're the Data Processing manager of a rather large car manufacturer.

You're trying to keep tabs on a full spares service for those fifteen million or so Beetles trundling around.

At the same time, you're attempting to institute a system that looks after the new models VW are constantly bringing out.

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Problems which will be solved by Nixdorf's 8820 distributed processing system.

For a start, one major way in which Nixdorf's 8820 solves problems is by not creating them. Even those of the small and niggling variety.

Because if you're like the Volkswagen H.Q. in Germany and have a distributed processing network of around 250 terminals, small niggling problems can soon add up to a twenty-four-hour major headache. Even if you only need a handful of terminals, you still want to avoid problems.

Which is why Volkswagen chose the Nixdorf 8820 distributed processing terminal system.

Quite rightly, the DP manager of Volkswagen knew he'd have enough on his plate without having to worry about hardware or software malfunction. (Let alone what's perhaps the biggest single problem that besets a DP manager. That of reorientating people in existing situations to run and operate the systems.)

Leaving aside for a moment the robustness, reliability and superior processing power of the 8820 we also decided to make it as idiot-proof as possible.

Hence diskettes which are impossible to erase and entry doors which are automatically locked when the machine is in action.

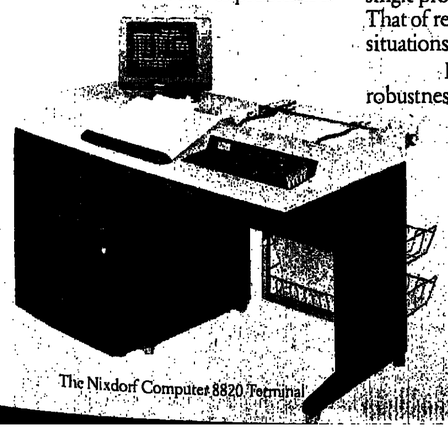
An automatic fault finding mechanism which is relevant to the 8820 is going down, locates and identifies the problem straight away. (This makes repairs far easier for the service engineer, who, incidentally, will usually be with the machine within 3½ hours.)

And a step by step operator guide which helps the operator to perform all functions correctly, first time round.

Another factor which could have influenced Volkswagen's DP manager's decision is the fact that the 8820 has, as we hinted earlier, processing power which is double that of the nearest competition within the price range. What's more the 28K core size can be doubled for only £1,300. (Compare that with £3,000 for an extra 16K from the competition.)

We'd like to think, though, that Volkswagen chose Nixdorf's 8820 by looking for a terminal manufacturer who shared their philosophy. That of making and supporting the most reliable, robust machinery on the market.

So, if you'd like to know more about the Nixdorf system that helps to keep the world's most popular car on the road, write to or contact Roger Neill on 01-572 3111.



The Nixdorf Computer 8820 Terminal

NIXDORF COMPUTER

Nixdorf Computer Ltd., Hounslow Centre, Hampton Road, Hounslow, Middlesex.

Fortronic delivers

FIRST production prototypes of a banking terminal developed by Fortronic for the Clydesdale Bank have now been delivered.

The terminals allow rapid customer and account verification on each transaction.

Clydesdale is planning to install them in all its branches to provide the basis for a distributed data network with centralised inquiry and data collection facilities.

Fortronic has also reached a draft agreement with Computer Industries, Iran, the government-backed terminal manufacturers, for a joint development venture on a terminal that has both Farsi and Roman type.

A NEW control unit has been introduced by BASF which enables its IBM plug-compatible disc drives to be attached to the small 370/125 mainframe. Called the 6033 control unit, the device, shown here, will handle up to eight drives, including the BASF 6236 100 Megabyte and 6230 200 Megabyte drives. A 6033 controller and 6230 drive are equivalent to an IBM 3333, according to BASF.

Paisley upgrades

A PRIME 400 minicomputer with 512K of memory, two 80 Megabyte disc drives and supporting 48 terminals, has been installed at Paisley College of Technology, Strathclyde, at a cost of £50,000. The low price was due to Prime's policy of buying back the first computer its customers install. The college bought a 256K Prime 300 early this year and traded it in for the 400.

Tymshare link Down Under

THE Australian Overseas Telecommunications Commission is considering the installation of a node to allow users throughout Australia to access Tymshare's US packet-switched network. The main attraction to users is likely to be the wide range of databases available on Tymnet, but the mode would also allow Tymshare to market its service bureau facilities.

Following the lead of the UK Post Office, most European PTTs are now offering similar services, allowing users to link to both Tymnet and the US Telenet packet-switched network (Computer Weekly, August 11).

OP SPOT

Following the recent theft of a Ventek System Op Spot considers the increasing possibility of computer systems being stolen . . . and advises on security precautions.

As systems get smaller, risk of theft grows

SECURITY is a word often heard around computer installations. In the majority of cases it is applied to the safety of the data processing system as a whole, rather than the physical security of the hardware.

Many hundreds of pounds may be spent ensuring that a system is available only to authorised users, by means such as passwords and other software checks. Yet the physical security of the system is often entrusted to a simple magnetic card key access system.

The supervision and operation of this access system is frequently abused; lost keys are often replaced without question, and seldom is the key mechanism changed.

The key access system does perform a basic job in restricting access to the computer area, but it is not the last word in security.

The recent theft of a Ventek system (CW, September 8) shows that physical theft is something we must face as a real possibility. Computer systems are growing smaller in size, and feasibility of stealing a system is growing inversely.

But security should primarily be aimed at ensuring the physical security of storage media, such as discs and tapes. These are the true ways in which a system can be disabled, and magnetic media require protection.

The computer area attracts many visitors, who come as users to deliver and collect input and output, maintenance staff to maintain the system, and ordinary visitors who come simply to look. All these categories of visitors *must* be controlled.

The system will also attract the attentions of malcontents, who see it as an easy way of inflicting harm on the company. International organisations and companies are particularly prone to this form of attack.

Fire is another danger in the computer room, but this is a problem that can easily be tackled, not only by providing ample fire-fighting equipment, but also by training staff in the efficient use of the equipment. A well disciplined fire-fighting team can pay handsome dividends.

Fire detection equipment should not only be installed in the computer room and adjacent area, but also in the air-conditioning plant room, stationery store, and in false floors and ceiling voids. An adequate fire detection system is not a luxury, but a necessity. The system should be designed to sound fire alarms in the entire complex, activate an alarm to notify the fire brigade, and automatically activate the extinguishing system in the computer area.

Theft is a problem in many installations. Steps, though not necessarily elaborate, should be taken to ensure that petty pilfering is avoided. This includes the theft of such items as engineers' tools, and smaller items of equipment.

More serious is the theft of confidential data and software. An accurate analysis of the computer log should reveal any abuse of machine time; but the physical aspect of the theft of processing time can more easily be avoided by changing the manning of shifts at regular intervals.

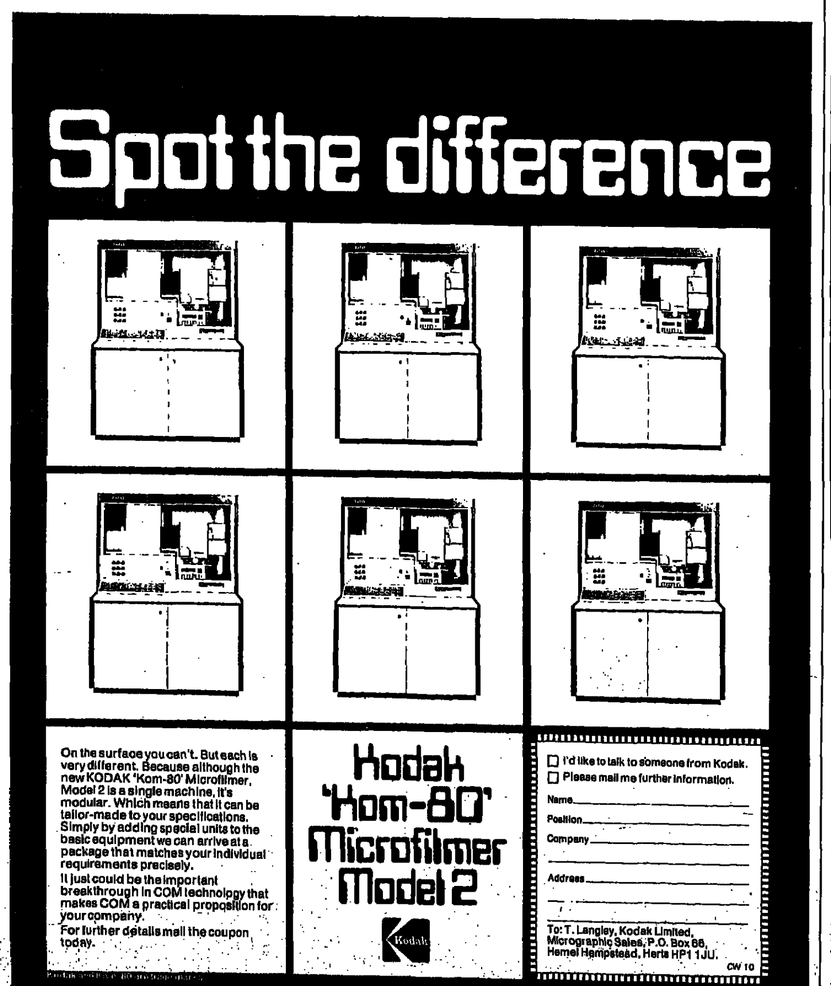
Prevention is better than cure, and to this end many steps can be taken to increase the security of the system and installation. The security of an installation is drastically increased if the computer is housed in its own purpose-built building, situated away from the main complex. Unauthorised persons would be identified more easily if they attempted to approach the installation during periods of closure.

Illegal methods of access to the building can be restricted by incorporating as few windows as possible. Where windows are installed they should be of toughened or wired glass, and of the "fixed" variety.

Security guards, where employed, should be advised in writing of any computer staff who will require access to the building during evenings, nights or weekends whether they be workers' regular shifts or on overtime. No staff member should be allowed access during these times unless there is written authority with the security guard to this effect. This must should be inflexible. Additionally, in order not to sow the seeds of familiarity, the security guards should be changed regularly.

A computer is a valuable piece of equipment, and deserves to be treated as such. It should be remembered that it cannot be replaced "off the shelf", and its loss would cause serious disruption throughout the company. Replacement could in many cases take up to 12 months, and even a loss of disc packs or magnetic tapes could cause serious disruption to the company's daily operations.

Spot the difference



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CW 10

Puerto Rico buys Honeywell Level 68 Multics system

THE first Honeywell Level 68 Multics system to be sold outside continental US is going to the Puerto Rico Highway Authority. Puerto Rico is the Caribbean island administered by the US, and the Highway Authority needed the special secure features for which Multics was designed, because it intends to sell time on the machine to outside users.

As well as being designed to isolate each user completely from all others by the use of "rings of protection" in its architecture, Multics was designed as an interactive system, and these two features led Honeywell the contract over IBM, the resident supplier of the 370/158 is being replaced, and Burroughs and Univac.

Most of the Multics software is written in PL/1, and the Highway Authority foresees little difficulty in translating programs written in other IBM languages for the 168 into PL/1.

Word processing conference

A TWO-DAY conference on word processing aimed at those involved in the growth of information handling systems, is to be held on October 25 and 26, at the Regent Centre Hotel, London.

Under the title "Putting Word Processing Into Perspective", the conference, organised by On-line, will look at four points: the importance of word processing to office and business systems management, who are control the advanced word processing systems as they evolve, where will word processing and data processing merge and why, are prices considerably increasingly involving as compared with performance.

For further information contact [illegible]

MICROPROCESSOR NEWS

Low-cost system to debug Z80 programs

AS the majority of design effort in realising microprocessor-based applications is proving to be in software rather than hardware, Zilog has produced a low-cost Program Development System specifically for debugging and developing software for Z80 systems.

At a cost of £2,100 for a minimum configuration, the system, called the Z80-PDS, generally obviates the need for hardware development effort by utilising in its construction boards from the Zilog microcomputer card range. In this way, software developed on the PDS can easily be transferred to the target microprocessor system constructed of boards of the same type.

The basic configuration consists of a single floppy disc drive offering up to 300K bytes, 16K bytes of read/write memory and 3K bytes of PROM. It also includes a serial I/O with RS-232 or strappable current loop interface.

This can be expanded by a variety of option system modules that include the Z80-10B I/O board, the Z80-SIB serial I/O board, the Z80-VDB video display board and the Z80-PPB PROM programming board. The latter allows a variety of PROM devices to be programmed on the board directly by the system, once the applications software has been developed.

The hardware is packaged in two units consisting of a card enclosure, complete with power supply and space for four cards, and a floppy disc drive.

The software for use on the PDS is the same as used on the Z80 Development System and the Z80 microcomputer family. It includes a disc resident operating system, editor, assembler, debugger, and file handling utilities.

As the system's read/write memory can be expanded up to 32K bytes, Zilog has taken the opportunity to make available two assembler options, one specifically intended for operation on the larger configuration.

Although the Z80-PDS can be operated as a stand-alone system, Zilog foresees a considerable market for it acting as a satellite to the Z80 Development System. Up to four PDSs to one Development System can be operated in this way, reflecting the ratio of computing power required by software and hardware development work.

The price also reflects the generally lower level of finance available in Europe for microprocessor-based applications development. Much of the initial effort in realising the Z80-PDS came from the company's European operation.

Zilog's portable program development system (Z80-PDS), for developing and debugging Z80 programs, includes 300K bytes of floppy disc memory.

Intel adds to SBC range

A NEW single board computer specifically optimised for use in stand-alone applications such as programmable controllers, remote data gathering and intelligent peripherals, has been added to its SBC OEM range by Intel.

The SBC 80/04 operates from a single 5-volt power supply rail, and is available at a cost of £72 in quantities of 100 units.

The heart of the board is an Intel 8085 8-bit microprocessor. A read/write memory of 256 bytes is provided in static RAM, and the board also includes 22 programmable parallel I/O lines, serial I/O lines with TTL line drivers and receivers offering provision for CCITT V24 transmission, a 14-bit programmable interval timer and a four-level vectored priority interrupt system.

Sockets are also provided for up to 4K bytes of non-volatile program storage and the line drivers and receivers that are user selectable to configure the parallel I/O to suit particular applications. The parallel I/O lines are brought out to an edge connector that can be mated with ribbon, woven or round cables. The serial I/O can also be accessed from this connector.

Comart widens its service

MICROCOMPUTER mail order and retail specialist, Comart, is widening its service capability with the provision of a hardware and software consultancy.

Operated for the company mainly by freelance specialists, the service will provide a kitbuilding facility, together with advice on hardware, and a fault correction and debugging service for both hardware and software.

Comart is also releasing a catalogue covering S100 bus-compatible products from Cromeco, North Star, Dynabyte, Franklin Electric Corp and IMSAI, for which it is UK representative.

MicroSim addition

AN addition to Pactel's MicroSim enables users to relate microprocessor simulations to real time.

Known as MicroSim 8080, the program is an inter-assembler that combines the ease of use of an interpretive approach, with the efficiency of a true assembler. It has been developed jointly by Pactel and D. M. England and Partners, both Intel consultancies.

Object of the new program is to overcome the main shortcoming of most cross compilers — that they give the programmer no indication of execution times on the eventual target microprocessor system. The program incorporates a "clock" register which can be examined at any time during or after a simulation run. This will show the exact count of target machine cycles. Alternatively, the clock can be set to a negative value representing the time available for a program. The simulation will halt with a message when the time has elapsed.

The program is available on a dial-up time shared basis from Allen Computer Services, or for installation on the user's own computer.

Double density diskette system

AS part of its Intellec 888 microcomputer development centre, Intel has introduced a double density diskette system that can operate with Intel development systems as a stand-alone item.

Designated the MDS-DDS, the diskette system utilises a soft-sectored format for data addressing. This allows up to half a million bytes to be stored on each disc, in up to 200 separate files.

Micro-based unit replaces TA 10

THE low-cost Triumph Adler TA 10 office computer of which more than 1,000 have been installed in the UK, is to be superseded early next year by a desk top addition to the microprocessor-based TA 20 series announced earlier this year. Costing about £3,000, the machine will be called the TA 20 Compact and will be usable as a typewriter and calculator as well as an accounting computer.

The TA 20 Compact will be sold by Triumph Adler's UK subsidiary, Adler Business Systems, along with the rest of the TA 20 series (CW, July 7). This means that Office and Electronic Machines, the UK based company that has sold the TA 10, will cease handling Triumph Adler accounting products.

However, OEM will retain a very close relationship with Triumph Adler as the UK distributor of its typewriters and other office products and negotiations are taking place between OEM and TA that could lead to OEM taking a share in Adler Business Systems.

The TA 20 Compact will come with an Intel 8080, a 3K RAM and a 7-12K ROM, a 132-column printer with a golf ball — single element as TA prefers to call it — print head, and a cassette unit will be an option. It will be about the same size as a large typewriter.

Bigger TA 20 models can be supplied with matrix printers and magnetic ledger card units and cost up to £10,000. The more powerful TA 1000, of which about 400 are now installed in the UK, starts at £12,000 and can be supplied with floppy disc or hard disc storage.

Mostek design workshop

A TWO-DAY microprocessor design workshop, to be held by Mostek UK next month, will provide instruction in the hardware and software aspects of the Z80 system.

Aimed primarily at engineers with little or no experience of micro-computing, the workshop will cover the Z80, Z80A, their peripheral family, and associated static and dynamic memory system design.

The course, to be held on October 6 and at the company's London headquarters, is limited in numbers.

Most people already have a Reality user's manual

Reality understands English. So the obvious place to find the right words for Reality is an English dictionary. Choose the most useful words:- check, sort, list, control, inventory, value, together with those particularly associated with your type of business. It's as simple as that.

Reality is a computer-based data management system which stores centrally all data required for an operation (business, factory, warehouse, accounts department) and allows anyone interested — not just data processing professionals — to access and update files whenever necessary using an easy to operate TV-type screen or printer.

What's more Reality can be used wherever the work is being done. And as many enquiries can be made simultaneously as there are terminals on the system — providing the security password is tapped in first.

If you can speak English then Reality will answer back

However, Reality understands more than just English. For the EDP specialist it copes with high level application-oriented languages such as DATA/BASIC or RPG11.

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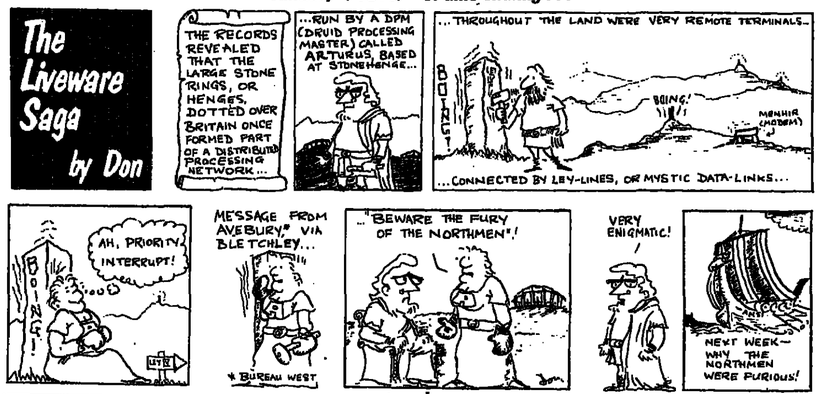
REALITY from CMC

Rummaging through the records from which we first started publishing excerpts in the form of the Liveware File on January 1, 1970, punch girl Bella made a startling discovery which adds another dimension to the concept of time sharing . . .



PEOPLE

New German office for Racal-Redac

RACAL-REDAC of Tewkesbury, Gloucestershire has opened a new sales office at Bensberg, near Cologne in West Germany. It would serve a large area of North Germany to meet a growing demand in the field of computer aided design systems.

Racal-Redac already has its headquarters in Munich, established nine months ago for the company's printed circuit board design systems. The Bensberg office will be run by John Babbington as sales manager in charge of the office.

Elected a member of the council of the Institute of Statisticians, is Barry Quirke, managing director of the CRC Group. Last year he became a Fellow of the Institute, of which he has been a member since

Alan Savage, now product manager of Extel's computer products group, was previously with CASE as a sales engineer; **Alan Marks**, who has become sales engineer, impact printers with Extel, was formerly a sales engineer with PKS Designs.

Staines

Millar

Tom Valentine, latterly chief accountant at Beckman Instruments, has become financial controller.

Wright Air Conditioning Ltd of Birmingham, has appointed **Russel Millar** as a senior development engineer to deal specifically with the development of new products. He was previously a project engineer with Stone-Platt Crawley Ltd of Sussex.

Roy Staines, formerly a project manager in management services division of C and A Modes has been retained by Compute (Bridgend) Ltd as a marketing representative for all CBL software.

Gordon Strickland has been appointed as manager, systems and marketing support by Sweda International (UK). He was formerly with NCR as a retail systems support manager.

Francis Rowe has become director of systems marketing programs for Data General in the US. He was formerly head of special marketing projects and director of product marketing. **Lawrence Seligman** becomes director of small business systems development; formerly he was head of the systems products organisation, which becomes part of the new division.

IT'S tough at the top . . . a move by David Finan (right) a computer operations shift leader from Newcastle, is watched closely by spectators at the final of the British Othello Championship held in London earlier this month.

Finan was beaten by two games to one in the final match by the new British champion, Joseph Woch, a representative for a pharmaceutical firm. Woch goes on to play in the World Championship in Tokyo next month.

Computer Weekly Othello offer: see page 6.

Wally Wells, who has been with Datasaab UK for the past three years, has been appointed deputy managing director of the company. He had been manager of the Southern division of Datasaab for some time.

BIS Applied Systems Ltd has promoted two of its employees to principal consultants. **Howard Beale** was previously a senior consultant and **Paul Green** was a project manager. Another appointment announced is that of **Ray Beasley**, previously software team leader with Automobile Association at Basingstoke, as an associate consultant.

Beasley

Wells

Bob Mail has been appointed director, finance and administration with Honeywell Information Systems UK, effective October 16. He succeeds Dick Vereal who returns to the States as vice-president, finance and administration. Mail was previously director, financial planning and analysis in Honeywell's systems management office in Minneapolis.

DIARY

SEPTEMBER 26-28
Distributed computer control systems — international conference. IEE, Birmingham.

SEPTEMBER 27
Distributed intelligence, seminar. BCS. Café Royal, London W1. 9.30.
Computer fraud. J. M. Ross. BCS, Birmingham branch. Priory Dene Hotel, Edgbaston, Birmingham. 14.30.
The man/machine interface. Mike Cooley. BCS, S Wales branch. Central Hotel, Cardiff. 18.30.
Note: BCS Natural Language Translation Specialist Group meeting has been cancelled.

SEPTEMBER 27-28
Meeting. IBM Computer Users' Association System 3 Group. White House Hotel, London.

SEPTEMBER 27-30
Annual conference. Operation Research Society. The Queen's and Magdalen College, University of Oxford.

SEPTEMBER 28
Computer access to large databases using alternative store technologies. Ken Groves, Peter Waterworth, Roy Brierley. BCS Information Retrieval Specialist Group. City University, London. 14.00. Tickets £1 from Pauline Walters, at the BCS, tel: 01-637 0471.
The protection of data by cryptography, seminar. NCC/NPL. Cumberland Hotel, London W2. 10.00.

SEPTEMBER 28-29
Meeting. IBM Computer Users' Association Local Authorities Group. Hampshire County Council, The Castle, Winchester.

SEPTEMBER 29
Annual dinner. G. A. Fisher, guest of honour. BCS Advanced Programming Specialist Group. Tickets £6.00 from Prof J. H. King, 10 Gower Street, London WC1. 19.30.
PL/I in a CMS environment. Tony Smith. BCS PL/1 Specialist Group. LSE, London WC2. 17.30.

OCTOBER 4
CEGB computing present and f... BCS, Kent branch. St George's ... Chatham. 19.30.
Introduction to the Winne ... historical view of processor develop... Peter Ford, Dr R. N. Bates. ... Nottingham branch. T1 Mds ... Theatre, University of Nottingham.
The minicomputer and its ... commercial DP. Martin Healey, ... Time Users Group. Staff House, ... sity of Birmingham. 14.30.

OCTOBER 4-5
Datafair '77, the end user, ... conference. BCS, Cunard Inter... Hotel, London W6. Details: Oyez ... tel: 01-242 2481.

OCTOBER 5
The new ANS Fortran standa... growth of preprocessors. BCS ... Specialist Group. Cunard Inter... Hotel, London W6. 18.15.
PL/I, what's in it for you? C. ... Barker et al. BCS PL/I Specialist ... Cunard International Hotel, London ... 18.00.
CADE, computer-aided desi... engineering in telecomms. Colin ... BCS South Essex branch. The Ex... Basildon. 19.45.

OCTOBER 5-6
Regional electronic instrument ... tion. Electronic Promotion Dev... trial and Trade Fairs Ltd. Essex ... Coventry.

OCTOBER 6
Computers in a law office. ... Andrews. BCS Law Specialist ... Polytechnic of Central London, ... W1. 18.00.
The use of computers in the ... services. BCS Medical (London) ... Group. Cunard International ... London W6. 14.00.

COURSES

OCTOBER courses from Hoskyns include: programming management, October 10-14; project managers, October 10-14; commercial systems anlysts (four one-week modules), October 10-November 4; operations supervision, October 17-21; computer systems design, October 24-28. For details of these and more, contact Valerie Burr, Course Registrar, John Hoskyns and Co Ltd, 91-93 Farringdon Road, London EC1M 3LB, tel: 01-242 1951.

A THREE-PART course of lectures on computer architecture is held by Brunel University. It is organised as a series of talks, each presenting an overview of a particular field and runs from October until June. Each talk is complete and can be attended independently of the others, or students can register for one or more terms. Further details are available from R. M. Lea, tel: Uxbridge 37188 ext 335, or 01-866 3923.

SOCCER

Announcements

AS THE Summer Computer Lg... approaches the end of the season ... Winter Knock-Out Cup is on... All interested teams, of DP ... whether from the league or ... should note that there will be ... meeting at the end of this month ... work out arrangements. Co... Danny Boreham on 01-240 1... for details.

Tickets for the Summer Lg... river trip on October 5 are ... available from Danny Boreham ... £2.75 each.

● And teams from anywhere ... in the Manchester area interested ... playing in a knock-out cup ... possibly a league should contact ... Bacon at Combyte Services ... 061-928 5265.

Centronics to enter end-user market in a major policy shift

A MAJOR change to Centronics' marketing policy in Europe was revealed by Terry Harris, vice-president of the company's European operations, in London last week.

Hitherto Centronics has concentrated almost exclusively on the OEM market, and although this will still account for a major share of the printer manufacturer's business, Harris said that "as part of our expansion plans we have decided to begin selling actively into the end-user and data communications markets in Europe ... We see the end-user market representing a significant portion of our total European revenues."

The way in which the end-user market is served will vary from subsidiary to subsidiary. The UK company will operate through end-user distributors: Cable & Wireless in England and Wales, Dacoll in Scotland, and Cara Data in Ireland, with Cable & Wireless undertaking all third party maintenance.

In Germany, Centronics will undertake its own end-user selling and maintenance from offices in Frankfurt, Hamburg and Munich. And in France the company will use its own sales force in the Paris region but will operate through distributors in the provinces.

Spearheading Centronics' move into the end-user market is the 761, a 300 baud teleprinter which is available in RO and KSR versions, with a variety of optional features including an APL character set.

The 761 APL will be shown for the first time in Europe at the Sicob exhibition in Paris, which will also be the occasion for the official announcement and first showing of the 702, a 120 cps bi-directional matrix printer.

Also being exhibited for the first time in Europe at Sicob is the Micro 1, a low-cost ($745) non-impact printer developed in association with the Japanese manufacturer, Sharp. The Micro 1 prints at a rate of 180 lpm, with up to 80 characters per line, by way of electrical discharge on to aluminised paper.

The Micro 1 stands very much outside the line of development represented by Centronics' more conventional impact printers, but the company sees it as being particularly suitable for industrial, test equipment and mobile applications; for producing VDU hard-copy; and as an end-user product in the hobby market.

Following Sicob, Europe's next major computer show, Systems 77 in Munich, will see the official release of the 763, a 1200 baud teleprinter which was previewed at the NCC in Dallas earlier this year.

According to Terry Harris, the last 12 months have been a period of intense activity for Centronics in Europe. The European headquarters and the UK subsidiary are now based in new offices in central London. In Germany the Frankfurt offices have been expanded twice, and sales and service offices have been opened in Hamburg and Munich.

In Paris, too, the company has just moved into new offices, while a new subsidiary is being set up in Italy.

In Ireland, Centronics is planning to move from a leased factory to a new purpose-built plant.

The head-count of European employees has risen from only five two years ago to nearly 80 today, not counting the employees at the Irish plant. And Europe now represents 20% of Centronics' worldwide revenues.

Tim Palmer looks at four major new products

UK launch of ITT's challenge to SNA

John King, director of marketing, ITT Business Systems, is a graduate of Bristol University and has some 20 years' experience in the DP industry. He has held senior positions in systems engineering, general management, consultancy and marketing with IBM, Telex Computer Products and Metra Consulting Group.

A COMPREHENSIVE alternative to IBM's Systems Network Architecture portfolio of products has been put together by ITT Business Systems, and their launch takes the company a long way down the road towards the electronic office of the future.

The products were first announced in West Germany under the Communications Network Architecture label (CW, March 17) and have since been introduced into France (CW, May 12).

Formal UK launch takes place at the beginning of October, and the portfolio has been slimmed down to four major products. The 3470 key-to-floppy disc system built by ITT in Spain is not yet offered in the UK.

Starting point for the portfolio is the well-established ITT 3280 cluster terminal system which ITT gets from Courier of Phoenix, Arizona. The 3280 competes with IBM's 3270, and ITT claims that over 10,000 units are installed and on order throughout Europe.

No major enhancements have yet been made to the 3280, but IBM has announced major improvements to the 3270 which largely remove ITT's competitive edge (CW, May 26). In response, ITT is discussing developments with Courier which will again give the 3280 advantages over the IBM 3270.

The key item among the new ITT products is the 3805 communications processor, which comes from ComTen of Minneapolis and competes with IBM's 3704 and 5 devices.

The 3805 allows much more of the communications processing load to be handled outside the 370 mainframe than does SNA, and ITT believes that it will enable users to build hierarchical networks without the need to upgrade their mainframe.

In addition, one 3805 can front-end two similar or different mainframes, and the device is usable both as a front-end and a remote concentrator for more economic line use. The 3805 handles terminal polling, and a Terminal Initiated Line Switching package enables the terminal user to switch between applications and software packages.

ITT has a second processor, the 3807, for people needing a front-end with more line capacity than the 3805 offers. The two are software-compatible.

As a remote concentrator, the 3805 can emulate the IBM Hasp multileaving workstation.

Compatibility is offered with SNA for people wanting to use some of the IBM devices, and non-standard terminals are also supported.

The ITT 3630 is a new range of remote batch and remote job entry terminals acquired from the Massachusetts-based Linolec subsidiary of 3M. The small integral processor which takes up to 32K of main memory is built by Linolec, and there is a microprocessor to handle communications. Programming is in assembler, and utilities, diagnostics and a data entry generator are also included. Secondary storage is on two to four 256K-byte floppy disc drives.

There is an integral VDU and keyboard, and other peripherals supported include magnetic tape, card reader, badge reader, character and line printers. Large cartridge discs are to be introduced shortly.

Emulations offered include IBM 2780 and 3780, ICL 7020, Burroughs and Univac, and communication is at up to 9600 bps.

The 3230, built by Courier and developed in conjunction with ITT, has no direct IBM counterpart. It is a teletype-compatible display system for data entry and file inquiry and update. It offers floppy disc storage, and one printer can be shared between several display stations.

Grand strategy

FORMED four years ago, ITT Business Systems brings together a number of ITT units with the grand strategy of developing a total communications network capability.

In the context of the electronic office, the company is therefore a major challenger for the market being developed by IBM through its Satellite Business Systems venture, AT&T in the US with its plans to expand into data processing services, and Xerox, which needs to diversify away from its dependence on the copier (CW, July 28).

The main elements of the company are the teleprinter specialist Creed, the company's PABX and message switching interests, and the data systems division. The new PABX family is the 4000 series, which includes the large 4080, currently undergoing Post Office approval procedures, and the 4040, which is barred from the UK by the Post Office monopoly on small PABX equipment. The message switching equipment includes the ADX 600 and 6000 store-and-forward systems.

It is a large company, employing some 14,000 people in Europe and doing annual business worth £300 million. Biggest complaint of marketing director John King is the difficulty of recruiting enough suitable people to enable the company to fulfil its potential.

EMS aims for £2m from small firms

LATEST contender for a share of the fast-growing small business systems market is Executive and Management Services, EMS Consultants.

The company sees a potential market of 30,000 businesses employing 100 or more people, and plans to "market the essential simplicity of computing without confusing the customer with jargon."

EMS plans to offer systems at a hardware cost of between £15,000 and £30,000, and is developing application software packages in Cobol for lease to customers.

The main packages are being developed for October release, covering financial management, sales order processing and payroll. Each package will cost about £1,000 a year to lease, but EMS will also tailor packages to user's requirements, or design new systems from scratch.

EMS has chosen the Honeywell Level 6 minicomputer for its new venture, and has placed an OEM contract with Honeywell for 50 minis over the next 18 months.

EMS has installed its own 6/43 mini in a new customer data centre at Five Ways, Birmingham, and customers are promised same-hour answers to software queries when they use the "hot line" to the data centre.

The software packages are being written to be compatible with those available for the ICL 2903.

EMS is designing what it calls "new concept" workstations for the system, which will allow two operators to share the VDU.

The company is looking for £2 million of business with the system in 1978, and £4 million in 1979.

USAF satellite launch

A JOINT National Aeronautics and Space Administration/US Air Force project is to investigate disruption of communication satellite services caused by charged particle bombardment from the atmosphere.

Called SCATHA (Satellite Charging At High Altitudes), a scientific instrument package satellite will be launched by the US Air Force in January, 1979, to investigate conditions at and near the geostationary orbit height of 22,300 miles.

Two NASA centres, the Marshall Space Flight Centre in Alabama, and the Goddard Space Flight Centre in Maryland are taking part in the project.

Harris wins $8.5m order

UNDER what is claimed to be the biggest single US Federal procurement for computer terminals, Harris Nashua Operations, formerly Sanders Data Systems, is to supply 200 Harris 8171 remote terminal systems worth $8.5 million to the US Defense Logistics Agency over the next five years.

The Harris equipment will be installed at 22 sites all over the US and will be linked in IBM 3270 mode to mainframe computers. The applications will be data entry, file inquiry, data retrieval and distribution control relating to the $6 billion worth of goods that the Agency supplies to the US armed forces.

OPPORTUNITIES IN WALES & THE WEST COUNTRY

Why many of the big firms have 'gone West'

By Alan Halfacre

IN this thumbnail sketch of the computer industry in the West Country, I will outline the problems employers feel they have in attracting members of that industry.

The basic problems of recruiting in any sphere of technology are divided into the working and social environments. The image that is created of these two areas is fundamental to the success of attracting and keeping key staff. My experience of the West Country leads me to believe that probably in both areas the employers undersell the potential opportunities.

In the West Country, local authority and central government installations tend to be bigger and thicker on the ground than in most parts of the UK. If

Looking at the job prospects in the West Country, Alan Halfacre, of AMJ Halfacre and Associates, and marketing consultant at W. H. Smith's computer centre, writes of the wide choice available in commerce and industry and says, "it is difficult to find any sector of business that is not represented by one of its major companies.

experience convinces you that the ICL 2900 range is the place to be, then MOD with Bureau West, RAF Innsworth, the Universities, Water Authorities and CEGB all seem to be in the throes of major conversions to new and in most cases significantly enhanced configurations. Dorset County Council among others is well ahead in its planning for a new 2900 system.

In the field of commerce and industry the choice is just as wide. If as an analyst you have experience in the high technology industries then Rolls Royce and BAAC have significant installations in Bristol. On the retail and distribution side there are Imperial Group, W H Smith, F W Woolworth and Debenhams. To cover the oil industry there are Burmah and Castrol and as for insurance there is London and Manchester, and so on.

In fact it is difficult to find any sector of business that is not represented by one of its major companies. For more detailed information on companies in the area, refer to the Computer Users Year Book.

Looking at the hardware used in the area the mainframes market is shared primarily by ICL and IBM. Significantly, I am unable to recall a 370/168 site; someone no doubt will be keen to enlighten me, but from 158 downward there are plenty of installations from which to choose. The density of ICL 2900 mainframes seems higher than most other parts of the country, with installations already in most towns and some areas becoming quite significant 2900 centres.

Swindon certainly seems to have a multiplicity of existing or planned 2900-based companies within a 20-mile radius, something worth keeping in mind when considering job opportunities. System 4 and 1900 users of course have a major influence on the computer spectrum of the area. Among the hordes of 1900s there are some System 4, notably four machines in Bath and five in Bristol.

Of course, there are the others but they are generally in the small machine business with the occasional monster like Nationwide's dual Univac 1110. Again the wide spread of mainframes should not deter the best in all fields of computing.

I will not try to persuade you that the West Country has everything, or say that it is the most beautiful place in the world. Nevertheless, one should not get the impression that it is even further out than the "sticks". People do not generally wear smocks or chew straw, although it is rumoured that they drink beer made from apples, and computers do run off electricity not farmyard waste.

The number of times I have heard people make comments about no theatre, no concerts. How far from the truth can you get?

For a start its worth examing how often you use those facilities when living in the smoke and anyway the West End via Paddington is often nearer for the West Country folk than the commuters from the Home Counties.

Local facilities are good and you have the added advantages of all the things that people travel across England to do — for instance — Poole Harbour or the Cotswold Water Park for sailing and Cheddar for climbing etc. The open air pursuits are always to hand and the classical cultural activities need never be far away.

On the housing front few people seem to have any difficulty settling in. Property is reasonably priced throughout the region when compared with the Home Counties; but there are some obvious exceptions. Don't expect a three-bedroom semi with a sea view at Torbay for £15,000, but think about Swindon or further west and you have a potential choice of houses between £10,500 and £12,000.

For those who want to take the opportunity of small town life within 20 minutes of the computer, Swindon would offer detached three-bedroom properties at £14,000 upward and semis at £12,000 plus, all within a radius of 10 miles. Certainly for those moving into the area from the London commuter belt, life is different, but housing and schools should present no problems.

So if it's really so attractive why isn't everyone flocking to work here? Having discussed the situation with a number of companies it appears that their views come down to two basic areas of concern: There appears to be a dearth of adequately experienced staff on the market. This is not because they do not necessarily exist but under present economic circumstances job security is put above all things. No one wants to be last in, first out. Additionally it appears that agencies are not clearing down their books so that they are becoming less effective.

The other aspect, it is widely felt, is that the right staff are not available at the right price. One company said it would not accept experienced ICL operators for their IBM system, it being easier to use trainees. Certainly, W. H. Smith has felt that finding experienced system support staff is difficult because they are so few and far between and those that do gain experience in industry often gravitate to ICL.

I have not deliberately avoided discussion on salaries; I do not believe there is much to be said. Every company has had problems due to the pay freeze but any differential between say London and West Country rates is swamped by the variance in salary paid by different companies for the same job.

In summary, if your experience is with ICL or IBM, or if you have no experience at all as an operator, analyst or programmer there would appear to be good job opportunity with progressive companies. Do not forget that a significant proportion of the major companies have moved West over the last 10 years to avoid the problems of London. As far as the family is concerned, I don't think they will be disappointed.

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Computer Operator required to work a three-shift system on IBM 370/145 (soon to be upgraded to 148) operating under DOS/VS, POWER and EPAT with remote job entry and T.P. networks. Applicants must have at least two years' experience. Good working conditions and salary, 4 weeks' annual holiday, contributory pension scheme, help with relocation expenses where applicable. *Apply to:*
Mrs. Pauline Hambrook
Dickinson, Robinson Group Ltd.
1 Redcliffe Street
Bristol BS99 7QY
Tel. Bristol 294284

DRG

DORSET COUNTY COUNCIL
County Treasurer's Department
COMPUTER SECTION
Programmers

An ICL 2970 to replace the 1904S is due for delivery in one year's time and Dorset now requires two more programmers who are experienced in COBOL — PL/1 would be an advantage — and a knowledge of George 3.

Salary Grade AP2/4 £2,983-£4,214 (inclusive of supplements)

Application forms returnable by 7 October, for further details from County Treasurer, County Hall, Dorchester DT1 1XJ.
(Please quote Posts TR(c)4 and TR(c)19)

BRIGHTON RULES O.K.!

We have dozens of vacancies in this delightful part of Sussex for Programmers and Analysts and Senior Analysts at numerous installations in and around Brighton. Salaries generally are excellent with relocation assistance and other benefits are being offered in most cases. If you would like more information about specific positions in relation to your experience to date and career enhancement please contact:

A. Jaffer or G. Minards
CBS Appointments
224 Old Christchurch Road, Bournemouth
Tel. 292185 or after 7 o'clock and weekends Wimborne 884891

The next regional feature to appear within the Classified columns of Computer Weekly will be on Scotland and will be highlighted.

To advertise in this important feature contact:

OWEN KELLY on 061-872 4211 or MARK WILLIAMS on 01-261 8019

Appointments

LONDON — Derek Blakemore — 01-261 8454
MANCHESTER — Owen Kelly — 061-872 4211
BIRMINGHAM — Alan Escott — 021-356 4838
GLASGOW — Owen Kelly — 061-872 4211
BRISTOL — Alan Escott — 021-356 4838
LONDON — Steven Bassinghwaite — 01-261 8174
MICHAEL WHITE — Classified Advertisement Manager — 01-261 8028/8658

MARKETING SUPPORT

ICL ANALYST/ PROGRAMMERS

LONDON/SURREY **TO £5,500 P.A.**

Amongst the world's leading manufacturers, our clients have experienced enormous success in the New Business Section of their UK division.
We are retained, in preparation for their continued drive in this market area, to recruit:

1 Senior and 2 Junior Analyst/Programmers

Essentially with COBOL or RPG II (preferably including 1900 experience) with a broad commercial systems background.
At the more senior level your challenge will be in:
★ pre- and post-sales project control.
★ co-ordinating resources in implementing systems.
More junior candidates will:
★ provide more technical support at Customer Centres.
★ gain an early opportunity of on site user liaison.
Candidates will possess qualities of enthusiasm, self-motivation, and effective communication.
Demands and rewards are high in this dynamic and varied technical environment; rapid career progression leading at an early stage towards Live-, Large project-, or Support-Centre Management.
CONTACT LONDON OFFICE, 01-935-0671. Ref. NO. 77/09/16.

A SECOND CITY OPPORTUNITY TO DEVELOP YOUR PROGRAMMING SKILLS

Salaries c. £4,200 p.a.

We are retained to recruit Programmers for our Clients, the Headquarters of a major manufacturing and distribution organisation, for their Management Services function.
Substantial systems development plans based on IBM and mini computers instigate the need for experienced Programmers to work utilising COBOL, CICS and Database software.
If you are an experienced COBOL/PL1 or Assembler Programmer, and wish to develop your skills by learning another language, this is your opportunity.

Candidates should possess:
★ A minimum of twelve months' programming experience.
★ Enthusiasm, self-motivation and the desire to progress in a professional and well-managed installation.
The Company offers attractive salaries, relocation assistance, and benefits including discount on Company products.
CONTACT: CATHY TRACEY, 021-236 3781 REF. 77/09/17

SCR
SPECIALIST COMPUTER RECRUITMENT LTD.
BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation St., Manchester M4 8BD
Computing Services Association

Experienced Programmers

Nottingham

Boots is a large international company. Our main activity in addition to retailing is manufacturing pharmaceutical, toiletries and agricultural chemicals throughout the world. Supporting these functions are large marketing, administration and research operations all based at Nottingham.
Our computers, an IBM 370/168 and an IBM 370/145, are located at our Head Office at Nottingham and we need experienced programmers to join teams working on
* Our vital new Inventory Control and Stock Replenishment Systems. These cover 70,000 items and over 1,200 branches throughout the U.K. served by a complex warehouse and distribution network. The systems will be designed for the company's needs in the 1980's and will involve some on-line work.
* Our expanding Production Planning and Costing Systems. These involve some 3,000 products, 20,000 production materials and components and will be used at out production units at Nottingham, Basingstoke and Airdrie, Scotland.
Programmers work with Systems Analysts in project teams which are responsible for all stages of project development from feasibility study through to implementation.
The appointments offer entry points to a large and comprehensive Management Services function where there is considerable scope for further career development. Conditions of employment include a profit sharing scheme, staff discount facilities and a contributory pension scheme. Relocation expenses are available where appropriate.
Application forms are available from: J. Hallam, Employment Manager (Commercial).

Boots

The Boots Company Ltd.,
Head Office, Nottingham NG2 3AA

Corning have upgraded to a 370/158 system.

If you're a forward thinking Systems Analyst, then upgrade yourself with Corning.

Corning are looking forward to the future by upgrading to an IBM 370/158 system operating in an OS/VS2 environment this month. It's a future you could look forward to as well.

A career with Corning Limited who manufacture Pyrex glassware and other specialist glassware opens a world of future opportunities. Literally, for Corning is truly a world-wide organisation, and you could find yourself working in the USA, Paris or Fontainbleau as well as Washington, Tyne and Wear.

The operating system is an OS/VS2 with database management and data communications facilities provided by CINCOM systems, TOTAL and ENVIRO 1.1 linked to overseas offices. Corning have implemented improved Programme Techniques based upon the TSO facilities of the IBM operating system. This offers quite a challenge to the Systems Analysts Corning are seeking.

It offers more than a challenge, in fact it offers good salaries, re-location expenses, and excellent housing and recreation facilities, too.

You will help in the development of on-line and batch systems initially providing marketing and financial information. You will need to have had the experience of instituting at least one major project within a large, integrated systems environment, preferably utilizing database techniques. Age 26+.

So join Corning in Washington - and upgrade yourself.
Apply to: David Green on Washington (0632) 466660 Professional & Executive Recruitment, Derwent House, Washington, Tyne & Wear.

CORNING

PER PROFESSIONAL and EXECUTIVE RECRUITMENT
Applications are welcome from both men and women.

MANCHESTER
TIME SHARING SALESMAN
(PUBLIC SECTOR)

Base Salary c £5,000
Plus on quota bonus of £5,500 plus car
Earnings of £10,000 should be expected

This is an unusual opportunity for a self-motivated sales professional, familiar with the Government and Public sector sales areas, to develop a major service company's client based in the North of England. Success will lead to an early promotion to a management level. The company is a market leader in its field, with superb products, support and impressive growth plans.

Candidates should:-

- ★ have either bureau sales experience (not necessarily timesharing) or system based business machine sales experience with a sound sales track record
- ★ ideally be familiar with Government/Public sector selling, however this is not a necessary requirement
- ★ reside in the North of England
- ★ be aged between 25 and 40.

To discuss this position further:-
CONTACT DAVID WADE
ADVISING CONSULTANT ON: 061-833 0676 REF. NO. 77/09/23

SPECIALIST COMPUTER RECRUITMENT LTD.
BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD
LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ
Computing Services Association

SCR

ENGINEERING PROGRAMMER

Ferranti (Scotland) Ltd. have a vacancy in their Commercial Field Services (Product Support Department) for an experienced programmer.

Experience would ideally be in software, the candidate having an interest in hardware and a good knowledge of mini-computers, especially in the P.D.P. range.

Candidates should be about 30 years old and will be able to communicate with engineers and users alike. An aptitude for trouble-shooting is essential.

The successful candidate will be expected to live in Aberdeen, travel at short notice and work unsocial hours.

Please apply in writing, with full details of experience and qualifications to:

John McPhee
Staff Appointments Officer
Ferranti Limited
Ferry Road
EDINBURGH EH5 2XS

FERRANTI

Amdahl
470 V/6 Software Support

The facts speak for themselves – In the 18 months from mid-1975 to January 1977 the first 30 Amdahl systems valued at almost £75,000,000 came on stream in North America and Europe. A performance which is quite unmatched by any other company and with the world's price-performance leader in large computers, we will be breaking our own records in 1977.

Our U.K. and European organisation opened up this year, first in Munich and now in London, the first British sale has been made and assembly facilities are well advanced in Dublin. It is a young, vital, enthusiastic and creative contributor to our growth, built on our policy of rewarding effort and initiative. Career development prospects for personnel joining us during the key formative stage are exceptional.

Software Technical Support
MVT/SVS/MVS/VM

You will work closely with Amdahl field staff and customers in our Field Support Centre resolving software problems encountered by 470 V/6 users. This is an opportunity to gain in-depth experience with operating systems' components while proving your worth as a trouble-shooter. Qualifications must include detailed knowledge of the internal specification of at least one major operating system, familiarity with operating systems' utilities and SMP. A relevant degree, HNC or HND would be an advantage.

Field Systems Engineers

We are looking for a record of success in customer service which will guarantee strong support for Amdahl customers, responsiveness to their needs and effective follow-through. You should have a sound knowledge of software systems, a background in large operating systems (OS/MVT, SVS, MVS or VM) and be confident of your diagnostic abilities. A formal qualification, possibly HND or HNC or equivalent is expected. Location will be in London, though there will be initial training in the U.S. and possibly familiarization work in Germany. Salaries and benefits are highly competitive.

Suitably qualified men and women should write with full details to:

Edward V. Cardinal, Manager – Field Technical Services
Amdahl International Ltd.
Sonnenstrasse 25, 8000 Munchen 2, W. Germany
Tel. 089/59.78.43

amdahl

Systems Programmers

Required to have assembler level experience and keen to move into the exciting field of message switching. You will be working on customer systems in a friendly and informal atmosphere. Some customer liaison will be required. We also have some vacancies for graduates in Computer Science.

Hardware/Software Engineers

Required to work on a range of advanced data communications products. You should have several years experience in digital logic design and/or assembler level mini-computer software, preferably with a leaning toward microprocessors. Current projects planned or in development use 16 bit microprocessors, single chip microcomputers, bit slice microprocessors, MOS and magnetic bubble memory techniques.

Service and Installation

These are appointments for engineers who seek the freedom and responsibility of Field Engineering, who are experienced in customer handling and have a knowledge of minicomputers, modems, multiplexers, intelligent terminals or message switch service/installation.

Systems Engineering

To plan and engineer — from initial specification through system design and commissioning — the successful implementation of mini-based message switch systems.

Test Engineers

To diagnose and repair faults in a wide range of computer and data transmission equipment. These are ground floor opportunities for young experienced Test Engineers.

We pay top rates for the right people.

Why not call me on Rickmansworth 76699. Nina Munford — Personnel Records

CASE is a young energetic company specialising in the manufacture of data communications systems. The company's products include multiplexers, concentrators, modems and message switching systems. Continuing expansion provides an opportunity to join an enthusiastic informal group in a job where salaries, conditions of service and career opportunities are excellent.

Make contact with CASE

CASE

COMPUTER AND SYSTEMS ENGINEERING LTD
Woodcock Hill Estate Harefield Road
Rickmansworth Herts WD3 1PL England
Telephone Rickmansworth 76699 Telex 923325

MYRIAD OPERATIONS
Computer Personnel Consultants

OPERATORS

LONDON **£3800-£4400**

This is an interesting and challenging opportunity for experienced operators to join an active department with an enthusiastic approach to computing.

Following an initial period during which the successful applicants will acquaint themselves with the installation and the suites it is running, they will be encouraged to work largely unsupervised. They will become involved in all aspects of operations and will be expected to demonstrate an ability to learn and progress.

Candidates should be able to offer OS or MVS operating experience, although consideration will be given to those with a sound DOS background. Availability for shift working is, of course, essential. However, in return a first rate salary is offered and promotion prospects, possibly into a new installation, are excellent.

Please telephone for a confidential discussion or write:
30 Fleet Street London EC4Y 1AA
01-353 5868

XENOTRON

PROGRAMMERS

Xenotron manufacture a specialised Video Terminal with graphics capabilities for use in the printing and newspaper industries.

The product incorporates a DEC LSI/11 microcomputer, floppy disc drives, and paper tape peripherals. Applicants should have 2-3 years' experience of P.D.P. 11 assembly language programming (PAL or MACRO) preferably on disc based systems, under RT11.

Xenotron is a growing company operating from a pleasant country town where housing is readily available and reasonably priced. Overseas travel opportunities (Europe and U.S.A.) are available in support of significant export orders.

Applicants must be self motivated and capable of working without supervision towards stated objectives.

If you would like to apply and feel you have the required experience and would like to work in a challenging environment offering an attractive salary, please write or telephone.

The Managing Director
XENOTRON LIMITED
Vinces Road, DISS, Norfolk, IP22 3HH
0379 4880

PROFESSIONAL SOCIETY
EXTERNAL RELATIONS MANAGER

The British Computer Society seeks a first class administrator to co-ordinate its Conferences, Publications and Technical Advisory Services.

The Manager will report to the Secretary-General and to the elected Chairman of the Technical Board, to whom he will be responsible for:

a) the production and marketing of periodicals and special publications;
b) the implementation of an integrated programme of conferences and seminars;
c) the development of an information service;
d) the promotion of the activities of a diverse range of special interest groups;
e) the preparation of submissions to Government departments and the development of contacts with kindred professionals and external organisations, including those overseas.

The requirement is for a competent administrator of graduate status aged between 35 and 50 with inspiration, determination and a facility to master quickly technical matters with which he/she has not previously been familiar.

Starting salary in the range of £6084-£8424.

Further details and an application form are available from:

The Secretary-General, British Computer Society
29 Portland Place, London W1N 4HJ (Tel. 01-637 0471)

PROGRAMMER

Public Health Laboratory Service

A programmer is required for a small team engaged upon a pilot project for the storage, retrieval and analysis of information for Microbiological laboratories. The work of the department is to be expanded and the programmer will be expected to assist in the development of the existing systems, the introduction of systems to other laboratories and new projects as they arise.

Knowledge of PLAN, COBOL and NCC TASN is desirable together with experience of GEC III operations on ICL 1900 series. A knowledge of ICL 2903 operations could be useful.

Salary in the scale (Senior Admin NHS) of £4408-£5218, which includes London Weighting and pay supplements. NHS Terms and Conditions of Service. For further details and application form apply Mrs. D. J. Davies, Personnel Officer, Central Public Health Laboratory, Colindale Avenue, London NW9 5HT.

FURTHER APPOINTMENTS APPEAR ON PAGE

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Why are CMG always advertising for staff?

The computer services market in the UK and the rest of Western Europe is growing at between 25% and 40% a year.

This is what is actually sold and not what *could* be sold if more resources were available.

The growth of CMG since its formation in 1964 has been substantial - Turnover during 1975/1976 was £5.4 millions.

To sustain our rate of expansion which is in line with market growth we will require at least thirty more people in our UK branches during 1977.

What's so special about CMG?

We are a young company committed to:-

- Building a successful company, wholly owned by those working in it, where each person could "be his/her own boss," to the maximum possible extent.
- Paying high salaries, providing top conditions, and pension arrangements in order to attract the best people in the industry, in return for hard work and maximum opportunity.
- Organising the company in small manageable groups and units, where everyone can know everyone else, with maximum delegation of responsibility.
- To making all management appointments from within.
- Making all information about the company available to everyone, with no exceptions.
- Involving every member of the company in the decision making process through regular staff, management and policy forming meetings.
- Sharing profits, and enabling all staff to buy shares in the company.

What vacancies are currently available?

Systems and Programming Consultants

at CMG Middlesex at CMG West End
at CMG City at CMG Southern and at CMG Scotland

£4000 to £6000 £6000 to £8000
£8000 to £10,000

What exactly is a Systems and Programming Consultant?

Depending upon the requirements of the project to which they are assigned, our staff may be called upon to use any or all of their programming, systems, management and general consultancy skills. We do not separate programming from systems work as far as job functions are concerned.

Whilst at times people will use their experience of specific machines, languages, and applications they will also be required to draw upon their general computing experience and learn new specific skills with the assistance of other experienced CMG personnel. We therefore require people whose prime interest is in developing systems and solving business problems rather than working with specific equipment.

The main job satisfaction is gained from getting work ready within agreed cost and time scales. There is a considerable amount of customer involvement and everyone is expected to participate in the sales effort of the company. People are given all the responsibility that they can handle and there are unrivalled opportunities for promotion, all of which is from within CMG.

We require a minimum of two years programming experience. Experience on any commercial machines is considered relevant with experience of both mainframes and mini's being preferred. Similarly the particular languages used are not important but we prefer a knowledge of both high-level and low-level languages, with COBOL and any Assembler language being the most desirable.

Experience of project leading, customer involvement, management responsibility and sales involvement are not essential for all vacancies but some or all of this type of experience would be required for the more senior positions.

We require experience with commercial and financial applications with general accounting knowledge being the most useful.

Where do I apply?

Please write or telephone for an application form quoting ref: CW/30 to:

Jane Leiper,
CMG Computer Management Group
(Middlesex) Limited,
Westwny House, 320 Ruislip Road East,
Greenford, Middlesex UB6 9BW.
Tel: 01-578 4563

OR
Janet Gothard,
CMG (West End) Limited,
Sunley House, Bedford Park,
Croydon, CR0 2AP
Tel: 01-686 8251
(To be relocated in London)

OR
Ann Howlett,
CMG (City of London) Limited,
Eastgate, 73 Leman Street,
London, E1 8EY
Tel: 01-481 3881

OR
Barbara Clark,
CMG Computer Management Group
(Southern) Limited, Sunley House,
Bedford Park, Croydon, CR0 2AP.
Tel: 01-686 8251.

OR
Janet Stirling,
CMG Computer Management
Group (Scotland) Limited,
Highland House,
58 Waterloo Street, Glasgow C2.
Tel: 041 221 8193

CMG
London · Amsterdam · Frankfurt
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Programming Team Leaders
c. £4,500

Provident Managements Services Limited is a highly successful Computer Bureau using the most sophisticated data processing techniques including Database and Transaction Processing.

Promotion and expansion have created two vacancies for top class programming professionals with proven technical ability to take responsibility for a small team of programmers working on a wide variety of projects.

Depth of experience is as important as length and language is not a constraint as we use several and we will provide all necessary training.

Current and future plans for development and expansion of hardware and applications will provide plenty of opportunity for progression and varied experience.

We offer usual large company benefits including generous relocation expenses and excellent working conditions at our new purpose built computer site near Halifax, West Yorkshire.

Please phone or write to Tina Black at:

Provident Management Services Limited

Colonnade, Sunbridge Road, Bradford, West Yorkshire, BD1 2LQ.
Telephone Bradford 33321 Ext. 231

COBOL PROGRAMMER

We are an expanding computer installation currently operating 256K 370/125 under DOS/VS. We have a number of on-line systems running under IBM's MTCS Teleprocessing Monitor, and are also using VANDL/1 Database software.

Progression to more advanced software is envisaged in the near future.

We require a COBOL Programmer aged 20-30 with approx. 1 year's experience in an IBM installation to work with the minimum supervision in a small enthusiastic and progressive team based at Slough. A knowledge of RPG 11 would be an added advantage.

For further information, please contact Paula Simpson, Personnel Dept., Sony (UK) Ltd., Pyrene House, Sunbury-on-Thames, Middx. Tel: (0932) 87644.

SONY

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

TRAINEE ANALYSTS

NORTH LONDON **c. £4000**

A progressive manufacturing company has openings for Programmers who wish to join a team and gain experience and training in systems analysis techniques.

Prospective candidates should be able to offer a programming background, preferably consisting of a minimum of 12-18 months in commerce or industry. Experience of a particular language is less important than possessing the potential and attitude appropriate to developing into an effective Analyst. Applications will be considered from those with either mainframe or minicomputer experience.

Duties will involve active participation in the analysis and design of real time systems. Those appointed will be given the opportunity to follow an interesting and worthwhile career. A realistic starting salary, depending on previous experience, will be offered.

SYSTEMS ANALYST

WEST LONDON **c. £5500**

A Systems Analyst is required to join a busy Systems Team developing primarily financial applications. The analyst will have experience of writing both system and program specifications and should be capable of taking project leader responsibility. He/she will have received a good grounding in analysis with either a programming or O & M background.

The Company, an international engineering group, is heavily committed to the continued development of computer systems within the group. Located close to both Central Line and M4 Motorway, the Company offers a competitive salary, 20 days' holiday, a 37-hour week and a subsidised canteen. A benefit package commensurate with a major company is also offered.

OPERATIONS and PROGRAMMING

EAST LONDON **FROM £3800**

Our clients form part of an international advertising organisation. Utilising IBM bureau facilities they offer the company a complete data processing service. They wish to recruit an additional person for their small but active D.P team.

The position will offer an ideal opportunity for a person seeking to work in a varied and interesting environment. As well as programming there will be the opportunity to visit the computer site and become involved with the day to day operation of the company's systems.

Suitable applicants will offer a mix of skills preferably including an operations background and some COBOL programming experience. The person appointed will be self-motivated and able to act on their own initiative, capable of liaising with user departments and will be able to react positively in a fast turnround department.

IBM SYSTEM 3 & SYSTEM 32 RPG II — DEVELOPMENT

CITY

An excellent commencing salary will be offered to the successful applicant sought by an international financial company. Currently an interesting daily trading application is being developed which will be based on IBM System 3 and distributed System 32 computers located in several countries in Europe.

An additional Analyst/Programmer is required to play a major part in the complete systems development plan offering the successful candidate excellent prospects of career advancement.

Applicants should have sound RPG II programming experience and be keen to undertake project analysis and implementation responsibility. Knowledge of a low level language and on-line programming would be an additional advantage.

Excellent conditions of employment include Non-Contributory Pension, BUPA, LVs and 4 weeks' holiday.

Please telephone for a confidential discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 5868

Programmers and Systems Analysts

EMI's Computer Services Department at Hayes have a lot to offer you

A brand new, purpose-built computer complex. A wide variety of projects, reflecting EMI's world-wide music, electronics and leisure industries – more than 60 operating companies.

A sense of security generated by size and success.

A highly developed concern for individual progress, typified by small, people-to-people teams which ensure maximum scope for special abilities and experience.

A salary policy which is highly competitive – plus EMI Group benefits which are everything you would expect of a very successful international company.

Discover how worthwhile your future could be. Select whichever location below is most convenient. Then just walk in. Any time between 5.00 and 8.30 pm, you'll find our Managers waiting to chat about your opportunities at EMI.

Monday
26th September
EMI 30 Golden Square, W1.
(Piccadilly Circus Tube Station)

Tuesday
27th September
Carnarvon Hotel,
Hanger Lane, Ealing.
(Junction of Uxbridge Road, and North Circular)

Wednesday
28th September
Master Brewer Motel,
Hillingdon
(Long Lane, where it intersects the A40)

Thursday
29th September
Post House, Heathrow,
(off the M4)

We've a number of vacancies, created as a result of expansion, for experienced Programmers and Analysts at all levels.

The installation: Honeywell Dual 66/20. Retraining will be given where necessary.

If you are unable to attend for interview, but still wish to apply, please write to:-

Grant Goldie, Personnel Department, EMI Limited, The Quadrangle, Westmount Centre, Hayes Bridge, Uxbridge Road, Hayes, Middx. UB4 0HB.

Telephone 01-848 0011, ext. 268 or Record-a-Call any time of day or night on 01-573 5524.

EMI

International leaders in music, electronics and leisure.

MANCHESTER
GENERAL MANAGER
COMPUTER BUREAU OPERATIONS

Salary c £7,500 + car + benefits

We are retained to recruit an experienced professional d.p. person to manage the day to day running of a computer bureau. The Company offers batch and on-line services through medium-scale hardware to distribution based industries and on a national level.

Candidates should:-

- ★ be aged 25/35
- ★ have a minimum of 3 years' man-management experience in a bureau environment
- ★ have a formal background in both computer operations and systems and programming.
- ★ be alive to the importance of customer contact
- ★ have flair and an innovative approach to the situation

It is probable that the successful candidate, subject to job performance, will be offered a directorship within the forseeable future.

CONTACT: DAVID WADE
ADVISING CONSULTANT 061-833 0676 REF. NO. 77/09/22

SPECIALIST COMPUTER RECRUITMENT LTD.
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LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ
Computing Services Association
SCR

PROGRAMMERS

The Communications and Control Group of Ferranti Ltd., Edinburgh, designs and markets telemetry/telecontrol systems for remote supervision and control of oil installations, electricity, gas and water undertakings, and other projects.

The Group is expanding its activities and wishes to recruit a number of programmers to join its existing team. These programmers will work on microprocessor systems, and the candidates should have some experience of small machine computing and be keen to work with a team of development and applications engineers. They will be involved in the use of a host computer for microprocessor programming.

Please apply in writing, with full details of experience and qualification to:

John McPhee
Staff Appointments Officer
Ferranti Limited
Ferry Road
EDINBURGH EH5 2XS

FERRANTI

Is familiarity killing your prospects?

Curiously, the closer you live to a career, the harder it becomes to judge your prospects. When you're subjectively involved in the present it's pretty difficult to be objective about your future.

Where you fail, though, we can help.

If you post the coupon below, we'll send you our confidential Lansdowne application form. Our form of interview. From the comfort of your armchair you can tell us all about yourself and any company you do not wish to work for (and your wishes are our commands).

We'll feed this information into our register and match it against the needs of our 3,000 client companies...a kind of 'Who's Who' of industry and commerce.

This register is no shotgun marriage. Only if our clients match your credentials will we shortlist you for a senior position.

A position you might well have overlooked.

As observers, Lansdowne can afford to be totally objective. We can honestly assess your prospects. Keep your options open. And perhaps recommend moves you may never have considered.

For men and women already earning £3,000 - £5,500

Our major clients are urgently looking for:

COMPUTING

Systems Analysts, Analyst/Programmers, Programmers, Operators, Software Personnel, Sales Executives

STRICTLY CONFIDENTIAL

Please send me more information and a confidential application form. I am interested in furthering my career.

Name:

Address:

CW22/9

Lansdowne Appointments Register

Design House, The Mall, London, W5 5LS. Tel: 01-579 2282 (24 hour answering service).

Great Sales Opportunities

In small business computers

An expanding International company with a highly successful range of small business computers has vacancies for sales executives (male and female) with a proven record of successful selling in the computer and business systems fields.

National Accounts Sales Executives

A very responsible position for an executive with sales experience in this very demanding area. Basic salary of £5000, plus expenses, with an escalating commission rate means that you make over £10000 plus an extra £1000 tax paid when you reach quota. Company car or £2250 a year car allowance.

Field Sales Executives

Vacancies in Leeds, Croydon and Birmingham. Candidates must be capable of negotiating at all levels. Basic salary of £4000 plus expenses. When you reach quota you make £9600 plus an extra £1000 tax paid. Company car or car allowance of £1750 a year.

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Taking right steps in exporting software

By Alistair Jacks

Suppliers of services have been forced to take a more realistic attitude towards the operation of their businesses as of late. And the software side is in the forefront of this trend.

While the market is specialised, its exploitation still requires the same skills as for other markets. This is particularly so for exports.

The UK is the software world's "bargain basement" and Alistair Jacks asks that prospective exporters think carefully about the way in which they approach the problem.

He offers suggestions for avoiding some of the pitfalls for firms entering the software products export field.

Alistair Jacks is the country manager of Computer Program Products (UK) which is the international software products marketing arm of the CAP-CPP group. CAP-CPP is a member of Insac, the NEB's computer services company.

IT is only recently that the computer industry in general has moved out of those much-publicised ivory towers.

Technology costs have been falling and business costs have been rising: both factors have tended to heighten our awareness of the computer as a profit centre in the organisation, with acquisition and operation costs being offset against positive benefits to the user company.

That kind of maturity in the marketplace has actually encouraged suppliers of data processing services and systems to adopt more realistic attitudes to their operation.

The development of the software products business is on the leading edge of this trend. Software packages are relatively cheap, typically about the same prices as a new car: so the buyer is not immediately antagonised or frightened by the price.

And they are identifiable products that usually do very specific things: it is relatively easy to quantify the effect, and it is equally easy to decide whether or not you actually need the product. Furthermore, the buyer is very likely to find a choice of products to do that job.

So if the computer business as a whole is moving nearer to the conventional commercial environment of buying and selling, the software products end of it is getting there faster.

At the same time it cannot be denied that the market is still a specialised one, requiring considerable specialist knowledge and consisting of buyers that require a good deal of expertise from any salesman.

Assuming that the vendor has decided that exporting is desirable it is simply a question of deciding how to go about it.

There are three approaches: you can go over yourself and market to the user, you can set up local companies and employ your own personnel or you can arrange local agents and distributors.

While visiting from the UK may be a suitable approach for large scale capital goods, to establish sales for a product which sells in volume requires local representation.

Obviously the third option must be cheaper for you in the short term, but to some extent you lose control of the product's presentation, and you certainly lose quite a large amount of the product's purchase price.

The agent's share can be something close to 70 per cent of the price if he is also providing local technical support: at the very least he will demand between 40 and 50 per cent.

On the other hand, the agent knows his market and is probably well established in it; clearly you would not have picked him if this was not the case.

Setting up a local company has its own problems. For instance, it is not easy searching for appropriate offices from a base 400 miles away, dealing in a foreign language with foreign employment and building-use regulations.

The estate agent is likely to be only the first of many people who could take you for a ride. And how do you find and assess suitable candidates for the all-important front-office jobs — the secretary, receptionist, typist, telephonist?

Even the apparently trivial details — like how to get your new telephone number listed in the phone book and the appropriate commercial directories — can present problems.

Our experience is that it will take three or four months at least to establish an office in an overseas country — and that's when a local man does it.

For a foreigner the task will probably need nine months at least. And during that time very little effective marketing will be possible.

Computer Program Products, the international product marketing arm of the CAP-CPP group, operates in eleven countries and it has been CPP's policy to employ nationals of the countries in which we operate. This definitely speeds the start-up in terms of getting an office operational: and of course if you take on the right person, you can effectively be buying a quick start to the marketing operation. Your local manager will be someone with experience of the local market and local commercial practice.

This can be critical. In at least one European country discreet kickbacks are still the normal way of easing one's way through the bureaucracy: it could be disastrous for a British manager not to know this. It could be equally disastrous for him to get the country wrong.

There are also national differences to consider. Belgium, for example, has a 13-month year for salary payment, so be wary when you quote a monthly remuneration to potential employees. Also the provision of company cars is much less common on the Continent than it is in this country.

There is also the problem of recruiting salesmen. It is hard enough to recruit people in the UK, the place we know best.

CPP's approach was originally to convert technical people to a selling role, but now we are moving more towards the recruitment of professional salesmen and the internal investment in training new people.

Selling is a very emotional business. It is vital that the local manager should feel that he or she has the autonomy and responsibility to run the local operation.

It is equally important for the head office to keep a steady eye on the activities of its outlying sales offices.

Inevitably there is a good deal of resistance to Head Office checking up on the local operation, but at the same time the local office needs a good level of central support — moral, technical, and managerial.

The general manager of CPP spends over half his time travelling around the group's various locations. A strong reporting system has also been built up.

And the group has, where possible, incorporated national offices as subsidiary companies, making the local manager a director and thereby giving him status and responsibility, as well as getting over the more prosaic problems like dealing with the VAT office and signing cheques, both of which have to be done by a company officer.

The actual business of selling can seem comparatively easy after all that. There is an astonishing similarity between IBM users, for instance. This is the principal market for CPP products, and we find that the North American bias generally, together with the fact that most 360/370 documentation is in English, considerably simplifies the job of selling IBM-compatible software packages.

In the metropolitan areas — especially in Holland — there is a willingness to use independently-supplied software and a good deal of knowledge about the products.

And at the other extreme, there are some relatively remote areas where the paucity of local job opportunities and the desire to share problems means that one sale for a product can quickly lead to others simply by the word of mouth contact between installations.

Support is the other important factor. No user with any sense is going to consider a poorly supported product, but support can be an extremely expensive feature of the software products exports business.

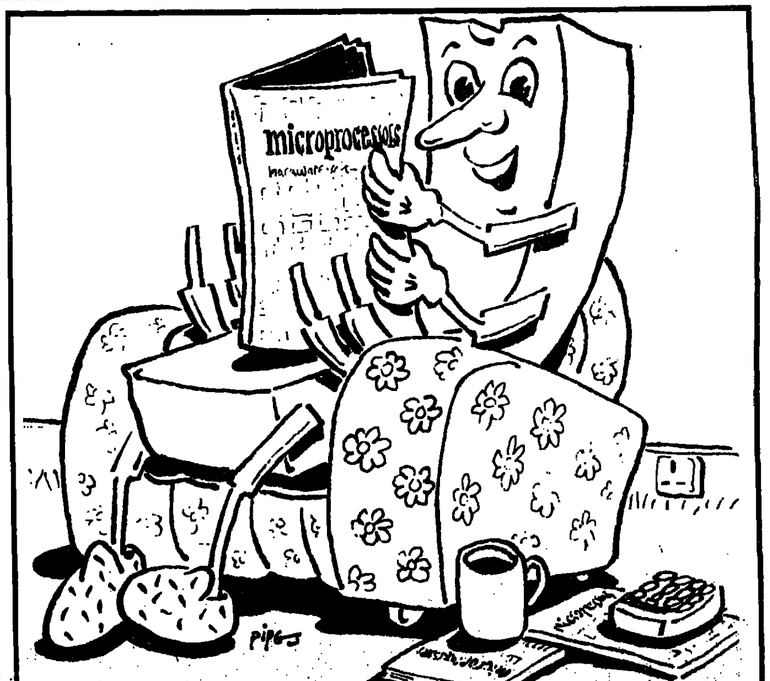
The key to profitability is minimising the level of support needed, by offering a stable product in a predefined environment.

CPP's approach to support is for local subsidiaries to offer a local level of support, but with a strong central technical support group based in Amsterdam.

At present CPP's main interest is in IBM-compatible packages, but in the near future CPP's European operations will start promoting MicroAde in earnest. MicroAde is a very different sort of product; it is a £10,000 development system that produces Cobol programs for microprocessors, and it runs on a Digital Equipment PDP-11 minicomputer.

We did consider organising agents for MicroAde. It is, after all, a very different product to the IBM packages. But our experience and our sums both indicated that by promoting MicroAde through the present CPP system we would achieve significant market penetration at least a year before any agency could.

That brings us to North America and the Insac connection. Insac Data Systems is the NEB subsidiary that is currently formulating its plans for the overseas promotion of products and services of its members: MicroAde could be the first product that is pushed through Insac.



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Bringing the power of the system directly to the job

Phenomenal growth of distributed computing

By Mike Aldrich

Software and data communications are the important factors in distributed computing, says Mike Aldrich, marketing director of Redifon Computers. He shows here how these factors have led to big differences between the uses of distributed computing in East and West Europe.

DISTRIBUTED computing is the child of micro electronics and effective user interface software. It marks a fundamental change in business computing comparable to the effects of the pocket calculator on personal numeracy.

Distributed computing brings the power of the computer directly to the job rather than the converse. It is an inevitable evolutionary development in harnessing computer power for tangible user benefit and for the majority of organisations, the employment of distributed computing techniques is likewise inevitable.

The development of minicomputers and microcomputers during the last 10 years has made available to the users a wide variety of systems capable of undertaking many of the business computing jobs formerly undertaken by large mainframe computer systems. After a slow start, in recent years, the development of effective software to enable these mini and microcomputers to be used in a business environment has proceeded apace and with some considerable success.

A gating factor on the widespread use of computers has always been the complexity/competency equation. Stated simply the more complex the piece of equipment is to operate, in the broadest sense, the more difficult it is to find people competent to use it. Remove the complexity, lower the threshold of competence and dramatically reduce the price of the product, and the market place for that product dramatically increases provided that the product represents a cost effective solution to the problem at hand.

Micro-miniaturisation has reduced the cost of manufacture of central processors and the development of magnetics has significantly reduced the cost of disc storage. Today's micro and minicomputers can operate in a normal office environment using standard power supplies and occupying about half the floor space of a standard office desk for a system with central processor, 128 Kbyte memory, 10 Mbyte disc and magnetic tape unit. The user interface into the system is no longer through the old technique of cutting holes in pieces of cardboard, sometimes called card punching, but rather through the interactive use of visual display units.

The key development, however, has been in the software area. The new systems manage to make the complexities and sophistication of virtual memory, re-entrant code and multi-tasking operating systems, completely transparent to the user. The user develops his programs using interactive compilers and English-like statements. The operator entering or retrieving data from the system is cued by the system through the operational sequence.

The nature of business computing has changed. No longer is the user emphasis on the batch processing capability of the mainframe but rather on the ability of the system to concurrently handle large numbers of terminal devices interactively and inexpensively. This does not mean that the mainframes are now or indeed will ever be, obsolete, merely that their role has changed from one of general purpose computing, that is the ability to do all kinds of computing, some efficiently, some not, to a role where in future they will be undertaking limited tasks for which they are pre-eminently suited.

The new role has been signalled by the announcement of network architecture driven by mainframes and comprising numbers of connected computers.

Distributed computing moves the power of the computer to the job, but as the job will normally be an intrinsic part of the overall business, then the results of the transactions will have to be communicated elsewhere. Data communications and distributed computing are therefore closely connected.

To date, computer data communications has been adequately defined as the twentieth century equivalent of the Tower of Babel. However, the impending implementation of the new international standards of High Level Data Link Control procedures married functionally to the X25 switching protocols at last provides a standard inter-computer communications protocol.

The old business organisation maxim of standardise, rationalise and simplify has been brought to bear on one of the most important areas of computer operations. While it will take some years for manufacturers to fully adhere to the new standards, at least we now have a standard method of computer data communications suitable for land line or satellite and offering an effective starting point for the next 10 years' development in data communications. In the interim manufacturers' proprietary protocols will continue to be used.

The social implications of distributed computing may well prove to be more interesting than the technical innovations. During the 1960s the growth in commercial computing centred around the establishment and development of computer departments within business, financial and governmental organisations.

The reasons are not difficult to identify. Large scale systems were expensive and demanding of foreign exchange. The ability to train and develop people in advanced computing is limited because of the limited numbers of systems.

Future development is seen in terms of mini/micro computers and keeping the technology up is a real attraction. The effective human interface software and many minicomputers is a vital consideration for obtaining attractive cost/benefits and transferring skills in high technology systems to inexperienced personnel.

Ironically, it is in the environments that the software technology, transparent to use, ignored by the western user, is eventually tapped and exploited by users to satisfy application needs that are often outside the context in which the systems were originally conceived.

In these Eastern bloc/Third World countries, distributed computing primarily replaces basic manual methods, where in the west, it is replacing mechanised methods. In former inter-computer communication is a posted magnetic tape, in the latter is a good quality land line. The computer thread is local processing using systems that are simple to use and use and relatively inexpensive.

Throughout the world, users are discerning in their evaluations of products and particularly careful in ensuring good technical and customer engineering services. Users pick manufacturers to sell and support their systems direct rather than operate through agencies. In the west, users prefer manufacturers' customer engineering but elsewhere users will often expect manufacturers to train user personnel.

Worldwide the relevance of distributed computing systems to the solution of data and information processing problems is firmly established. In the Western world, the impact is felt on the structure of organisations and the computer aware of the individual within the organisations. While the implementation of such systems grows rapidly, there has been evidence of a mindless rush.

If anything, the scale and complexity of many schemes is highlighting the need for good project management and users are being cautious in their approach to ambitious projects.

In the field of data entry systems, new technology has provided multifunction efficiency thus permitting much VDU data entry, local enquiry and up-dating, mixed media operation with OCR and OMR together, with mainframe communication, all from a mini/minicomputer based system. This versatility, without application potential, yet maintains the low cost and transparent simplicity of operation with the operating system software among the most technologically advanced in the industry.

This is the trend that will characterise distributed computing. The systems will shrink in size and cost, hopefully its simplicity will remain, the amount of work done locally will multiply. Eventually the systems will be interfaced to systems that will, with the word message and packet switching processing and the telematic developments, provide ultimate methods of sending and receiving business information.

taken was inevitable due to the high cost of equipment, the specialised environments in which the equipment had to run, and the demands of specialist personnel who were in short supply. Co-incidentally during the 1960s organisation theories of synergy (2 + 2 = 5 and similar) caused a tremendous amount of over-centralisation. Today the pendulum has swung the other way and the fashion is, small is beautiful. Thus many highly centralised computer departments are now under pressure to decentralise and move their computer power out to their end users.

Arguments for and against computer decentralisation abound with all the personal and political implications of any radical institutional change. Emotions can run high but the facts tend to indicate that total centralisation and total decentralisation are generally the most expensive systems. The most cost effective solution is somewhere in the middle and certainly evolutionary.

Fortunately, the maturity of existing computer users will prevent too many palace revolutions, to the relief of all concerned. For a realistic methodology for evaluating distributed computing, an NCC publication "Why Distributed Computing" is the best study available on the market.

Distributed computing provides direct computer access to a vast new public. The VDU is in fact becoming a standard piece of office furniture and as computer access becomes commonplace, the advent of terminal facilities in the home grows closer.

Distributed computing has found in the Western world — with its long tradition of improving office methods, its use of sophisticated office equipment and its good telecommunications facilities — a fertile environment for rapid growth. The economic circumstances of recent years and the advance of the electronic office have focused the attention of all levels of management on the lack of adequate information systems and the high cost/low productivity of scarce clerical labour.

Where centralised computing facilities are available, they are often found to be unresponsive and expensive to use for interactive applications. Compare then the ready availability of small powerful distributed computing systems that can provide the local manager with all the required facilities and simultaneously interface with the centralised system to everyone's advantage. Suffice to say computer manufacturers do not sell distributed computing. Users buy it.

In the Eastern bloc and Third World countries distributed computing is also becoming the norm, albeit for slightly different reasons. These countries have not experienced the rapid computerisation of the last 20 years in the west. The mainframe computers that are installed are small to medium scale rarely with data communications.

Telecommunication facilities are either very poor or non-existent and the over-riding priority is the provision of better voice communication not data communication. Rather than grow the existing mainframes, therefore, into larger scale systems, the trend is to avoid further centralisation and install distributed computing systems

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Enhancements for IBM's System 34

MAJOR enhancements have been announced to IBM's System 34 workstation-oriented small business system, only five months after its launch (CW, April 21).

Most significant improvement is the introduction of single or clustered remote workstations, enabling System 34 to be installed both as a remote terminal system communicating with a host, and as a host for up to 64 remote terminals installed in clusters of eight. Previously it could only link to an IBM host.

To achieve this, maximum main memory has been doubled to 128K-bytes, and a second communications adaptor is now attachable, offering bisynchronous or SDLC transmission at up to 9600 bps.

There is also a new remote display station, the 5251 Model 12, which supports up to eight Model 11 displays and 5256 printers in any mix. The bigger memory will be available in November 1978, and the extra communications equipment and remote concentrator in March 1979.

Additional programming aids and a Fortran compiler will be available in February 1978.

All software is available on a lease-only basis (CW, September 15).

DG releases its own language

FACED with increasing demand for a sophisticated high-level systems development language, Data General has released its own language, DG/L.

The minicomputer company has been using the language internally for some time, and several major items of user software have been written in it.

DG/L itself, however, will not be of value to the majority of end-users.

"The DG/L language and its concepts require technically qualified computer users," said a spokesman. "These users are highly systems software oriented, compared to the many users whose software needs fall into the applications development area."

This specialist market is emphasised by the terms on which the language is offered. No detailed customer support will be provided with the package, apart from 40 hours of system engineering services.

The language is based on Algol, having the block-structured format which has become increasingly popular as an aid to structured programming. It includes such advanced features as the ability to accommodate user-defined data structures and operations. At the same time, it is provided with "low level" capabilities such as the direct manipulation of storage addresses, and direct operating system interface.

The DG/L compiler runs on the Data General Eclipse, under RDOS and AOS operating systems, but can generate code for execution on any Eclipse, Nova, or even MicroNova, configuration.

The compiler is priced at $5,000. Duplicate copies may be bought for $150.

Tribunal rejects ASTMS claim on NCR redundancies

A CLAIM by the Association of Scientific, Technical and Managerial Staff that it should have been consulted over redundancies at NCR between December, 1976, and March, 1977, has been rejected by the Department of Employment's Industrial Tribunal.

About 28 people in the ASTMS area were made redundant in the four-month period, including programmers, computer supervisors, and other associated staff.

"The decision is disappointing, but not totally unexpected, and enables the company to continue to make people redundant without having to consult the union," said Jim Mercer, divisional officer for ASTMS.

"While NCR has every legal right to carry out these redundancies without consultation or adequate compensation it is not, in the view of my members, a good reflection on the company."

However, an NCR spokesman said that "the redundancies were and are part of the company's bid to develop and retrain its marketing force to sell computers and terminals more effectively."

Meanwhile, Mercer has said that despite the rejection of ASTMS claim, "It will not deter us from gaining bargaining rights with the company."

A meeting of ASTMS representatives in NCR has been called for October 15, when it is planned to discuss the situation, in addition to a meeting being held today (September 22) to recruit NCR computer personnel into the union.

Datacomms workshops

A SERIES of workshops on data communication and distributed processing is planned by IAG, the IFIP applied information processing group.

Attendance at each is limited to 25, and the first, to take place at the Marriott Hotel, Amsterdam on November 17 and 18 will be chaired by Robert Reid of Logica Benelux. Each participant will be expected to provide a short paper on his interest in the subject which will then be distributed and discussed at the workshop.

Issues to be covered include planning and implementation of distributed systems, the problems of man/machine interfacing, the stability or otherwise of currently available network technology, input/output devices, system management, safeguards against failure, and current hardware and software techniques.

More details can be had from IAG Headquarters, 40 Paulus Potterstraat, 1071 DB Amsterdam, Netherlands, telephone Amsterdam 76 35 26.

BR, Giro OCR orders

● From front page

on to the Recognition Equipment TRACE systems where alphanumeric information will be read and encoded in bar code form by an ink jet printer ready for multi-pass high speed sorting.

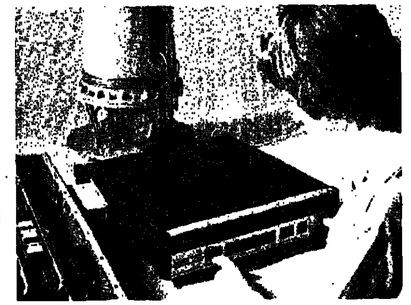
Data captured by the Lundy-Farrington system will be recorded on magnetic tape for processing on the ICL System 4 mainframes at the Giro centre.

The Lundy-Farrington LOTs are configured around multi microprocessors, including Intel 8080s, and at the Giro they will be linked in groups of 10 controllers, each based on a Digital Equipment LSI 11 minicomputer. The 10 controllers in turn will be linked to a central processing unit based on dual DEC PDP-11/34s.

Lundy Farrington hopes to win contracts for the system from Giros in other European countries. At the moment many of these use Recognition Equipment systems similar to those now at the Giro.

Eurocom centre

A NEW office and service centre has been opened by Eurocom Data Limited, the computer output to microfilm and microfiche bureau service of the National Westminster Bank, in Leeds. Equipment installed already includes a Bell and Howell 3800 front-end COM recorder, a D76 Datagraphics automatic fiche copier and a Canon vesicular roll film copier.



COMPUTATIONS of volumetric, mass and energy flow for process control applications can now be carried out by using the 7900, a process flow computer specifically developed for this work by Solartron.

The computer operates from a variety of inputs, representing such values as density, static and differential pressure, temperature, specific gravity, fluid flow rate and calorific value, taken live from transducers installed in the process machinery. Various configurations of live transducer or manually-entered data may be selected, on-site, to provide the desired output, and transducer characteristics may be displayed instantly for verification or amendment. This removes the need for normal setting-up procedures in the equipment.

Datasolve's second 2970

ALMOST a year to the day after installing an ICL 2970, the big bureau subsidiary of BOC, Datasolve, has ordered a second. The new 2970 will be installed alongside the first late next year at Sunbury-on-Thames. This expansion will not affect Datasolve's orders for an Amdahl 470V/5 and an IBM 3033 (CW, August 25).

Datasolve says the income from business on the 2970 has been double that forecast, with half the business coming from organisations using the 2970 as a test bed while waiting for their own machines to be installed. Terminal systems attached to the 2970 include a 2903 run by a customer in Holland. BOC accounts for less than 10% of the work on the 2970.

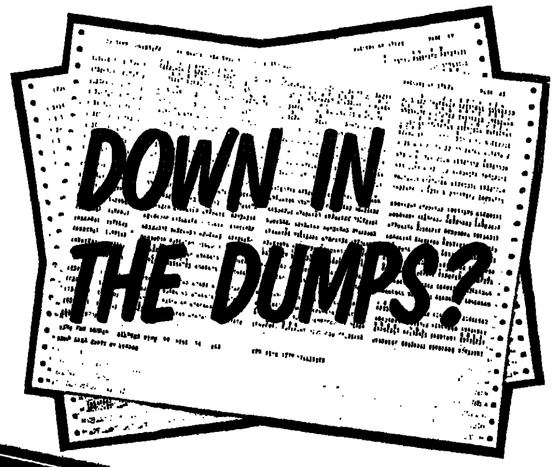
Burroughs' latest machines now in UK

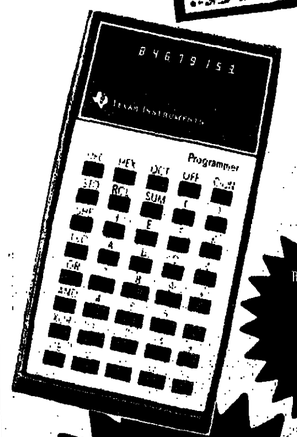
THE two Burroughs B800 switching and communications computers announced in the US (CW, January 6) are now available in the UK.

The new machines, designated B876 and B866-1 and 2, succeed the B700 switching systems, and are code-compatible with the commercial B800s, the B80 and the B1800. The B876 and the 866-2 both have 500 nanosecond processors and the 866-1 cycles at one microsecond.

Viewdata directory

FIRST directory to be made available on the Post Office's experimental Viewdata service is the Hollis Press and Public Relations Annual, which lists press information sources. Viewdata marries the television set, via the telephone, to a computer database.





Every programmer knows the discouraging feeling of being faced with analysis of reams of core dumps. Is 5E42 really equal to the decimal number which went in your test data? By how much is 42326764 offset from your program's base address?

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How to get your money's worth from software packages

Zoran Pirjevec, of Panosphic Syetems UK, lists eight pointed questions to ask before coming to a final decision on which software to buy. And he concludes that the key to success is the reliability of your peers, and the information they have been able to glean through first-hand knowledge of various software systems.

By Zoran Pirjevec

REACHING a final decision point on buying software is not easy, as people who have been on the Magical Technical Tour well know. Sometimes even the final results aren't enjoyable either.

It is agonising to spend great amounts of time and end up with a software package that doesn't do exactly the job you want. It is many times more agonising to try to write a system that is perfect, however, and that is why the software was purchased to begin with . . . and why the shortcomings are lived with.

In recent years, we have seen a common methodology develop for the evaluation and acquisition of proprietary software. That method states that you will (1) identify your need, (2) scour the directories for possible solutions, (3) write to vendors for literature on products, (4) schedule presentations with those with the most promising literature, (5) evaluate the products in the final running, and (6) make a final purchase decision.

This whole process is a narrowing-down exercise with the ultimate purpose of finding the best package to meet a need. The trick of making the search as fruitful as possible is to make the search as short (inexpensive) as possible, but without sacrificing confidence that the end product is the best available.

As a software vendor who has been around since the Great Unbundling of 1969, with some 4,000 customer companies around the world, we have been able to identify some short cuts and information gathering techniques that people can use to shorten that software acquisition cycle with greater confidence that their final choice is the right one. One still has to identify the need and survey the catalogue for the choices available. The intention of what follows is to shorten that narrowing-down process.

The first short cut comes into play shortly after one has identified the need for a specific software solution. It is called "knockout factors," a list kept in mind all the way through the process.

There are the obvious ones of upper cost limit, modifications necessary to make the package run on your machine, amount of core required, payment plans available (if you can't afford large sums of money at once, lease is essential for acquisition), cost of on-site evaluation, hardware/language restrictions, etc. Two additional areas of knockout factors should be explored early in the acquisition cycle. The first is the company behind the product. The second is product applicability.

When you are looking for a home, you are well advised always to look at the basement first before being excited by the wallpaper or the size of the master bedroom. The foundation is what holds the whole thing up. Software purchasing is no different. The company behind the product is the system's foundation. And it should be explored thoroughly. You are ostensibly purchasing software for a long-term benefit. You are paying a good deal of money for the software to keep up with hardware technology and computing advancements.

You want to make sure that is the intention of the company behind the products. If a company is profitable and successful, that is a degree of proof of market acceptance and stability. These are questions you should ask:

What is the sales and profitability history of the company? What is its financial strength? How old is it? What user organisations exist for your products? How widespread is your serviceability? Local? National? World-wide? How many products does your company sell? How many are on the Datapro Honour Roll of Software? Is the company a member of the Computing Services Association?

Assuming that the company behind the product looks sound enough to grow with your data processing needs, it's time to ask some pointed questions about the product itself. Try these:

1. What is the product's enhancement record? This will tell you just how well the product is keeping up with technology.

2. Is there a maintenance fee for this product, and if so, what do I get for maintenance?

3. What kind of technical support is there? Telephone only? Is there a periodic problem reporting system?

4. How good is documentation, and how often is it revised? Documentation is never perfect, but vendors who strive to approach perfection have your best interests at heart.

5. What kind of training do I get with this product? In general, the more comprehensive a system is, the more training is required. One should expect on-site or personal training of key personnel upon installation with possible follow-up training included as part of the purchase contract. The better the training, the more use the product will get and, thus, the more benefit it will be to your organisation.

6. How many installations are there of this product? You will find that the more installations there are, the more bug-free the system will generally be.

7. What modifications are necessary for installation? If there are any, they will cost you money. Find out how much.

8. Is there any charge for evaluation? This should have been stated at the beginning but it never hurts to ask.

Now that you have tested both the company behind the product and the product itself (all of which can be done on the telephone), you are ready to take some other short cuts that will get you to that successful software goal.

Chances are very good that, after you have qualified the vendor down to this point, he can give you excellent ideas on how to use the product.

Ask for user references in your industry and with your specific machine type and operating system, and contact them to find out about their experiences. The vendor can be used as a cost-free consultant during the process of software acquisition. He is a walking repository of information on cost-justifying his products, studies that show the benefits of his products, experiences of others both with and without his product, etc. It is also common and fair to ask each vendor about his competition . . . not to downgrade another product, to illustrate the superior or unique aspects of one product over another.

Get information from professional societies such as the British Computer Society or the Data Processing Management Association. Also try members of your hardware user group.

It is likely that if you have more than five people in programming and management in your installation, some of the people are relatively new. And it is likely that they have had software experience elsewhere in the data processing industry. It won't take long to ask your people if they have familiarity with any of the packages you are considering.

By no means should their opinion be the last word on the system evaluation, but their input can certainly give you some direction as to the questions that should be asked in a broad sense. There is a side benefit of such a polling, and that is that the employees love to have input on major decisions . . . technical people who have to work with systems especially like to have input on systems that they will be expected to use.

Then, when a final decision is made and the time comes to train your people and build product acceptance, because they were involved in the decision to acquire such a software product, that acceptance will be considerably higher than if they weren't considered at all.

This isn't the most economical way to evaluate software, but it is less expensive than subsidising your own evaluation research. The only way for the short cut to be truly effective is to check more than one source or commission more than one study.

This is because no matter how objective any one source might try to be, that source is limited by its knowledge . . . and if there is one thing you don't need when evaluating software, it's half-knowledge of a topic.

The key to success involves these short cuts is the reliability of your peers and the information they have been able to gather through first-hand knowledge of various software systems. For as much as packaged software provides systems tools without "reinventing the wheel," using the experiences of others saves duplicating shopping efforts.

Couple that information with your own and you will start more chance of picking the right product.

French install computers to probe UFO mysteries

The mystery of unidentified flying objects could soon be penetrated when a voluntary society in France fulfils its aim of installing two computers.

The Society for the Study of Spatial Phenomena, based in Toulon on the south coast, aims to install computers at a research centre it is setting up, and on board a mobile observation unit to control radar, meteorological equipment and spectrometers.

The society, with members ranging from 13-year-old schoolboys to doctors and high ranking officers in the armed forces, insists that it studies only hard facts and that the research centre and computers will help it along this path of objectivity. It also claims that they will put it ahead of similar organisations in other European countries.

The need for more accurate information on UFOs is shown by the fact that the US air force has investigated 12,000 sightings over the last 20 years.

About 11,300 have been identified as things like weather ballons and reflections of the moon; but that still leaves 700 to be explained.

Racal stake in Plessey stirs industry speculation

RENEWED speculation over a possible restructuring of the UK electronics industry has been stirred by the announcement that Racal Electronics now has a tiny holding, 0.4%, in Plessey.

Decca also features strongly in talk of a restructuring, but the company's chairman, Sir Edward Lewis, is understood to be against the proposals for a rationalising of the UK electronics sector to produce a second group to compete with GEC for a bigger share of export markets.

Racal has also declared small stakes in a number of other companies not directly involved in the computer industry.

Racal's new policy of building up small stakes in a variety of companies has aroused some critical comment from observers who say that the company is beginning to look like an investment trust — a company whose main business is investing in the shares of other companies — and ask whether this is the most appropriate use for the shareholders' money.

If this view gained strength it would tend to hit the Racal share price because most investment trust shares stand at a discount of about 30% on the value of the underlying securities they hold.

"The City is unhappy because it does not understand what is happening," a Racal spokesman told Computer Weekly.

"We have £40 million cash to invest, and our investment department believes that at the moment it is better to invest in well-managed British companies than in bank deposits or fixed interest stock now that interest rates are so low.

"The chairman has also said that Racal is acquisition-minded, but we have been buying and selling shares for years. And as for our own companies, any of those which want money for expansion can have it."

NEWS IN BRIEF

Zygal to design Sigma console

A CONTRACT to design and manufacture a control console for the Xerox Sigma range of computers has been awarded to Zygal Dynamics.

The contract, placed by Telefile Computer Products Inc, is for ten consoles, and shipment is due within the next few months. Each will be based on a Diablo HyTerm, and will be used as a primary I/O device.

THE Federal Highway Administration of the US Department of Transportation has awarded a $717,000 contract to Honeywell to study and improve software for digital computer-controlled traffic signal systems. Honeywell's traffic management centre in Minneapolis will conduct the four-year project.

MAKING a contribution to the relatively new science of colorimetry is a Digital Equipment PDP-11/05, linked to a spectrophotometer, which is being marketed by Color Assistance, a French company. The system also features a VT50 video terminal, a teletype, an LA36 DECwriter II and a graph tracer.

THE manufacturing and development facilities of Univac's disc drive manufacturing subsidiary, Information Storage Systems, are to be consolidated in a new $15 million centre at Santa Clara, California. Most of them are already located in that area, about 50 miles south of San Francisco. They produce disc drives partly for Univac, OEM customers, and the IBM plug compatible market.

A HIGH density bulk add-on memory for minicomputers has been introduced by National Semiconductor. Called the NS3-2, it uses 16 pin 16K bit dynamic RAMs and is supplied in the form of PC boards, each with a capacity of 128K by 22 bits. The access time is 280 nanoseconds and the read/write cycle time is 450 nanoseconds.

HIGHLIGHTS of the financial results announced by Digital Equipment for its fiscal year ended July 2 include worldwide sales of $1,058 million, 44% up on the year before, and a 35% increase in European turnover to $250 million. DEC's net profits worldwide in fiscal 1977 were $108 million compared with $73 million in 1976.

Robot language developed by IBM

AN experimental programming language that allows the user to program industrial robots with English-like statements has been developed by IBM.

Called Autopass (AUTOmated Parts ASsembly System) it features such familiar assembly terms as LIFT, PLACE, INSERT, and TURN, and uses a database called the "world model" to internally represent the machine's "real" surrounding environment.

Full details of research that has taken place on Autopass up to now is presented in a paper by Lawrence Lieberman and Michael Wesley of the IBM Thomas J. Watson Research Centre, New York, in the latest edition of the IBM Journal of Research and Development.

The authors say that the language is aimed more towards objects and assembly operations rather than motions of the mechical assembly machines themselves.

"The level of language has been chosen to provide a high degree of assistance to the user without systems having to perform artificial intelligence type problem-solving operations," they say.

Operating as a subset of PL/1, Autopass is said to offer many of the control and data type facilities of that language.

Access times reduced

ACCESS times for the Mostek 4K and 16K dynamic RAMs have been trimmed back to 120 nanoseconds, with a projection that by the end of the year access times will have been further reduced to 100 nanoseconds.

The memory cycle time now stands at 320 nanoseconds and power consumption is 462 milliwatts in the active state, and 20 milliwatts when on standby.

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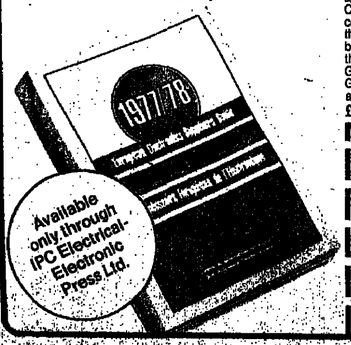

The second edition of this valuable three-language (English, French and German) directory gives details of 2,800 firms, including 130 from Eastern Europe. 880 products are grouped into 26 chapters, covering cables, components, computers, materials, production equipment and 21 fields of specialised application from aerospace to underwater engineering. Comprising 730 pages (A5 format), the new edition includes cross-referencing from products to manufacturers and—for the first time—from firms to products. Special attention has been paid to the indexing which is separate for each of the three language sections. European Electronics Suppliers Guide is published jointly by Verlag Fur Wirtschaftsliteratur GmbH (Zurich) and C. G. Wedgwood & Co. (London) and is available only through IPC Electrical-Electronic Press Ltd.

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Visual Display Units and their application

Edited by Derrick J. Grover
Chairman, British Computer Society Displays Group

Visual display units provide one of the fastest means of interaction with a computer, and they are being employed in industry in ever-increasing numbers. Their applications are wide-ranging, including airline-seat reservations, stock-control systems, information retrieval, stock-market and insurance quotations, text editing and information updating.

VISUAL DISPLAY UNITS is based on a tutorial seminar organised by the British Computer Society. The book is intended for computer users who already employ VDUs or plan to use them to enhance their system. It will be of equal value to management in their basic decision-making, and to the systems analysts and data-processing managers who put those decisions into practical effect.

contents

Review and trends *Derrick Grover, British Computer Society*
Technology of VDUs *Ingvarth Sars, Cisor Electronics*
Communications *Peter Barton, CASE*
Intelligence *Jan Birkmeier, Firmbel*
Software *Brian Lankshear, Logica*
Human factors in the design of VDUs *Roy Gladman, IBM*
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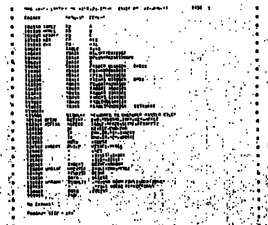

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DATAFAIR 77 John Kavanagh previews the BCS biennial conference

Theme goes wider than 'the end user'

GIVING Datafair the title "the end user" is not doing it justice, for although the papers are all relevant to that theme most of them are of much wider significance, not only to end users but also to data processing departments and even to the way companies are organised.

One speaker who points to the changes that computers are bringing to organisations is David Butler, chairman of consultancy Butler, Cox and Partners. He lists four areas of rapid development which are highlighted by the convergence of computing and communications.

First, he says, public and private networks are becoming a major preoccupation; secondly, distributed processing allows us to put computer power where it belongs — next to the person with the problem; thirdly, computerised telephone exchanges are becoming popular; and finally, different types of traffic — voice, data, texts — can be integrated into a single network.

But, says Butler, problems are accompanying these developments. What sort of integration is desirable? How will data processing managers face up to evaluating new methods? Will total chaos result from too much distributed processing?

Philip Hughes, chairman of Logica, wonders whether cheap hardware will give back to the end user the control he had over filing and information processing before the computer came along.

The changes should benefit the manager, says Patrick Losty, professor of business systems at Cranfield.

Advances in system design and in technology and moves from data systems to information systems will see a shift from a systems-centred philosophy to a management-centred one, he argues.

"In a few years the clash between computing structures and management structures, the difficulty of interrogating files and the problems of modifying systems will worry managers less. The current constraints upon the design of information systems will be relaxed, and more flexible information generating systems will match the realities of the manager's life.

"The manager who has operated as a bridge between the end user and the computer will find his role in many respects less stressful."

Two speakers from abroad are Kaoru Ando, president of the Fujitsu Institute of Computer Science, who will bring visitors up-to-date with Japan's "information society", and Drude Berntsen, director of the Norwegian Computing Centre, who will talk on "distributed bureaucracy", basing her speech on her work on the Norwegian government's data decentralisation committee, which looked at issues arising from the decentralisation of public sector computing.

Professor Losty also believes that the falling costs of hardware will make software inefficiencies unimportant. "The manager should assume the role of making sure systems are used effectively. The argument will swing away from economic use of expensive hardware to effective use of cheap computing."

Mike Cooley, a past president of TASS, the white collar arm of the AUEW engineering union, looks at the effect of computing on staff. He discusses the impact on the creativity, job fragmentation, specialisation, alienation, knowledge obsolescence and what he calls the proletarianisation of white collar staff, arguing that the belief that automation frees humans from routine, back-breaking and soul-destroying tasks, is completely false.

John Powell, data processing manager at Prudential Assurance, considers that the end user expects help both from the computer industry and from government. He says the user wants help from the industry in using technology to meet company objectives.

Powell says that from government, the user needs help in getting a reasonable return for his investment, plus freedom of choice.

Changing roles at work

THE British Computer Society's biennial conference, Datafair, starts at noon on October 4 on the topic of the user in a social environment. Papers will cover the changing role of management and labour, distributed bureaucracy and the Japanese "information society".

On October 5 the topics will be how new technology will affect the user, and the convergence of communications and computing.

Speakers on October 6 will look at the relationship between the computer industry and the government.

Running alongside the conference will be an exhibition by hardware and software companies and presentations by the BCS specialist groups.

Datafair will be held at London's Cunard International Hotel. Tickets cost £97.20 to BCS members, £27 to student members and £113.40 to non-members. Prices include lunch, tea and coffee breaks, and VAT. The BCS dinner on October 5, when the speaker will be Sir Monty Finniston, costs £14.

Details from Oyez IBC Ltd, Norwich Hose, Norwich Street, London EC4. Telephone 01-2[illegible] 2481.

The show that caters for all tastes

PRESENTATIONS by hardware and software companies will truly complement the Datafair conference with its "end user" theme, while a "technology corridor" will give visitors a chance to see technologies of the not-too-distant future, such as voice data entry, bubble memories and speech synthesis.

Six companies will be featured in the technology corridor. **Quest Automation** will show its Datapad, which accepts hand printed data; **Plessey** will show users what bubble memories are all about; and **Ferranti** will explain the design and manufacture of large scale integration devices.

Systems involving speech will be featured by three companies. **EMI Threshold** will demonstrate air traffic control, cash and carry checkout and parcel sorting applications on its voice data entry terminal, while **Electronic Music Studios** will present a computer controlled speech synthesiser called Vocoder for the first time in the UK.

And Mike will be out to steal the limelight from Adam on **Logical Machine Corporation's** stand. Mike is a voice recognition system, while Adam is the now well-established business computer which is claimed to be the first computer to allow users to create their own systems in their native language.

Another EMI company, **SE Labs**, will show its SE1002 electrostatic printer, which runs at 550 lines a minute.

Printer terminals ranging in speed from 10 to 120 characters a second will be shown by **Teleprinter Equipment**.

IBM will feature its 3277 interactive terminal and the 3790 electronic telephone exchange. Communications equipment will also be shown by **General Audo** and **Data Communications**, which will feature its line monitor switch and patch equipment for V24 modem interfaces.

The **Post Office** will give informal lectures on topics ranging from the organisation of the Post Office to modem developments. Tickets for these lectures must be reserved in advance: telephone 01-432 1691

Software houses and consultancies giving presentations will include **BIS Applied Systems** with its Micro-Cobol CAP with its Micro-Cobol claimed to be the first portable business language; **Selec**; **Arthur Anderson and Co**; **Touche F International**; **Infotech**, with its training courses; **Logica** and **Pactel**.

The **National Computing Centre** will talk about its software — including Filetab — and its books.

And visitors who are dissatisfied with the British Computer Society can find out all about the Institute of Data Processing

Specialist presentations

SPECIALIST groups in the British Computer Society will be giving presentations one after the other throughout Datafair.

The timetable for the presentations is:

October 4: 2-3.30, microform group; 4-5.30, disabled group; 6-7.15, business information systems group.

October 5: 9.30-10.45, computer operations group; 11-12.30, auditing by computer group; 2.15-3.45, first time user group; 4.15-5.45, Fortran group; 6-7.15, PL/1 group.

October 6: 9.30-10.45, privacy committee; 11-12.30, UK[illegible] tion council; 2.15-3.15, [illegible] group.

The disabled group will present Mavis, described as a prototype mini information system which supports special devices that can be used by the disabled.

The operations group will show how operations can help the end user.

The simulation council will give a broad introduction to the principle and applications of computer simulation for non-specialists.

BASF data traffic sign for safety

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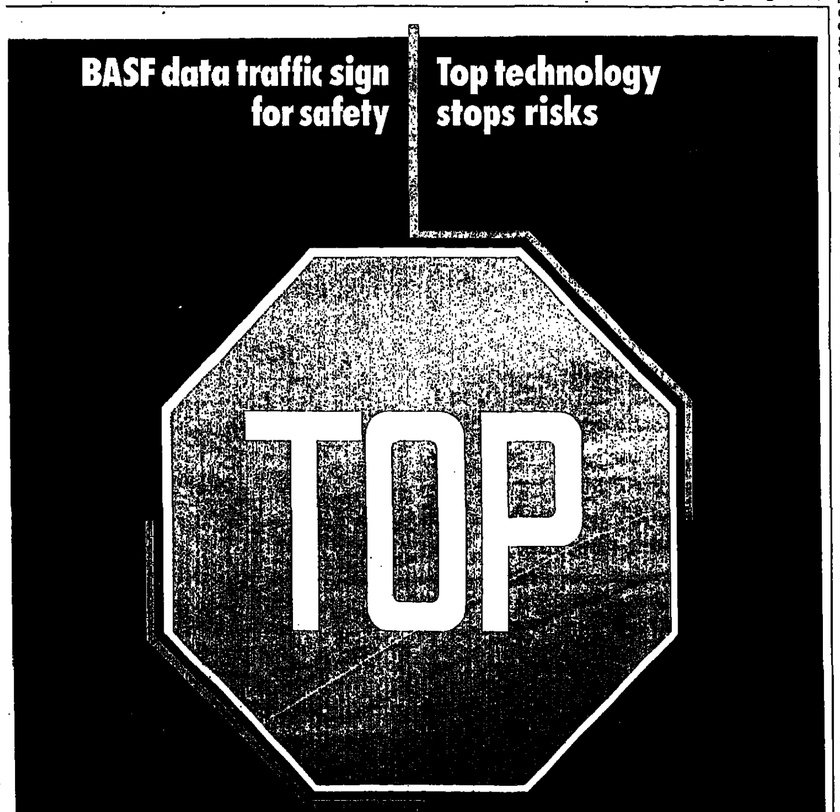

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The ITT 3805 is a comprehensive and powerful programmable communications front-end processor for attachment to IBM mainframe computers. It provides flexible network control and enhanced networking without the need to change tried and tested applications or mainframe software.

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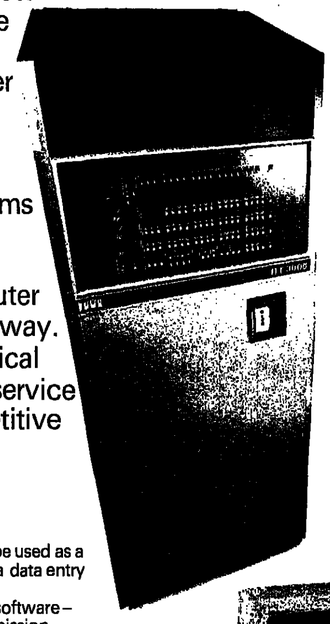
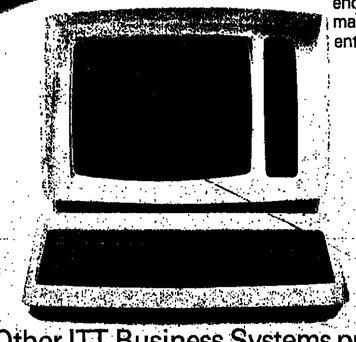


ITT 3230 Visual Display System

The ITT 3230 Visual Display System has been specifically designed to meet all the data communications needs of the Systems Designer, the DP Manager and, of course, the operator. It is very versatile, good looking and above all, cost-effective. No equivalent system offers so many features at a comparable price. The ITT 3230 with its diskette attachment is particularly suited to file enquiry and update although many will see it in a data entry role.



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ITT Business Systems ITT

Keith Jones talks to the European boss of US mini maker

Doubled profits, then growth, is aim of new man at Modcomp

CAUTIOUS determination is the watchword of John Pitt, who has taken on the role of general manager to supervise all the European operations of US mini maker Modular Computer Systems.

Pitt took on the newly-created post at Modcomp about two months ago after eight years with Digital Equipment. When he left DEC he was market planning and development manager, industrial products group for the US and Europe.

He was based at DEC's US headquarters in Massachusetts, but the Modcomp job brings Pitt back to his native England, to Woking, Surrey, the focal point of the company's European marketing and support team of more than 100.

Despite serious losses last year in the US, Modcomp in Europe has been profitable for the last two years — but not profitable enough for John Pitt.

While refusing to reveal the current level of profitability, Pitt says, "I want to double the profitability of Modcomp's European operation on the current level of business and only then will I invest in growth.

"Europe is now a separate profit and loss centre from the US operation and my first priorities are to build a workable European organisation and administration from the individual subsidiaries in France, West Germany, Benelux and the UK and our agents in Scandinavia, Switzerland and Spain.

"Before my post was created, Modcomp had a sales manager for Europe but no general manager to co-ordinate the whole operation."

Modcomp's four main areas of activity worldwide are industrial control and measurement, OEM communications and commercial DP, in that order of importance and, according to Pitt, the last area will have to remain more or less dormant on this side of the Atlantic until the European organisation is sorted out.

"At the moment we have no separate sales team for commercial systems in Europe and we will only move into this business when we understand the training and software support implications. We are deliberately hanging back."

The geographic distribution of Modcomp's sales in Europe at the moment breaks down something like 40% in Germany and 25% in the UK followed by France and Benelux.

"Germany is the biggest market because that's where Modcomp started in Europe, but I can see France increasing in relative importance," says Pitt.

Europe accounts for about 15% of Modcomp's worldwide turnover, and on the question of whether the company will set up a manufacturing operation over here John Pitt is predictably cautious. "We do not have the resources to look into this at the moment but we hope to review the situation over the coming year."

$15m credit agreement

AFTER a dramatic improvement in its financial performance in the first six months of this year compared with the same period in 1976, Modcomp has signed a new borrowing agreement with its three lending bankers. This will provide it with a $15 million line of credit through to March 31, 1978.

Modcomp hit rock bottom in the second quarter of 1976 when it recorded a net loss of more than $4 million on sales of $7.4 million, making the total net loss for the first half of 1976 nearly $4 million on $17.3 million sales.

In contrast, second quarter figures for 1977 included a net profit of $612,000 and $13.8 million sales, while first half 1977 net profits were $855,000 on $26.5 million sales.

One of the most significant facts about the figures is that Modcomp's total costs were only marginally higher in the first half of 1977 than in the first half of 1976 — $24.7 million compared with $23.4 million, though sales increased dramatically.

Modcomp attributes this to greater cost consciousness and higher efficiency. It has also brought in new vice-presidents to supervise operations (manufacturing) and finance, and has set up an executive committee of board members to formulate long-term plans. This is headed by John Lobb, former chairman of Northern Telecom (CW, September 15).

John Pitt . . . "I want to double the profitability of Modcomp's European operation on its current level of business, and only then will I invest in growth."

CHESSLAB

Brilliant move spotted

● From page 4

The adjustment did not work and they were landed with after all. After the first t moves Kaissa was in any c out of the openings book.

Black's programmers expres ed distress when Chess 4.6 ma her ugly-looking ninth mo White's were similarly open Kaissa's 13th. At move Botvinnik gave his opinion N-N5 should have been play by Black, and would have w decisively.

On move 27 the Cyber 17 Minneapolis to which the Ch 4.6 terminal was connected went down. Control Data engineers switched to another mach losing only seven minutes.

In the final pawn and Chess 4.6 was regularly see ing out to a depth of 12 p consequent on the great red tion in the lookahead branch factor (of the order of only legal moves from each positi There was none-the-less co pense as to whether the progr would be able to convert his position into a win.

It would be wrong to conclu from the tournament results that from this game that, program, Chess 4.6 is necessa the stronger. The Cyber 1 processes upwards of 15 m instructions per second. Ka was running on an IBM 370 for which the comparable fig lies between three million a five million. Not enough known of the relation betw the performance of chess p grams of this general type the amount of computa performed per move. More c be learned in October w Kaissa will run on an Amdahl in a challenge match a International Master Bo Levy. The increase of proce power of the Amdahl over IBM 370/168 is approxima two-fold. If defeated Levy s to lose a £1,250 wager.

Alltransport sets up export department

FOLLOWING the growth computer exports in the A transport International Group special export department has been established.

It is linked to the comp import services already ope ing at Unitair Centre, Heathrow airport depot of Al transport.

A six-man team will deal wi documentation, packing, insurance and other aspects ments, and it will be a door service offering lower than mal freight rates.

The new department will communicate with the IATA traffic clearance computer ru by HM Customs, and bonded warehouse facilities are avail ble.

Telenet implements X25 interface

PACKET-SWITCHED network operator Telenet Corp has announced that synchronous communication for computers and terminals using the standard X25 interface is now available on the nationwide Telenet network.

The announcement will come as a surprise to many, because it had been widely assumed that Telenet conformed to the X25 standard from the start.

In fact, Telenet began operations at about the time that the Consultative Committee on International Telephony and Telegraphy, CCITT, decided to establish an international standard interface for packet-switching, and although much of X25 was pioneered by Telenet, the need to begin offering commercial services caused the company to go ahead without waiting for the complete standard specification. As a result, there are discrepancies between the CCITT standard and the Telenet interface.

Telenet initially will offer X25 support from Boston, Chicago, Dallas, Los Angeles, San Francisco and Washington.

Raytheon Data Systems is the first manufacturer to introduce the X25 interface for its IBM 3270-compatible Raypac terminals. The X25 version of Raytheon's PTS-100 system was announced in the spring (CW, April 14). IBM has also said that it will provide an X25 line adaptor for people wanting to communicate between Systems Network Architecture devices over a packet-switched network.

The only full X25 network currently offering public service is Datapac in Canada. Transpac in France and the EEC's Euronet will both use the standard, and most European PTTs, including the UK Post Office, are considering introducing X25 networks.

The Japanese NTT network will also use the standard (CWI, July 21).

Studies of the disc drive market

TWO studies of the disc drive market, one concentrating on moving head hard disc drives and the other on the floppy disc drive industry are now available from industry consultant James N. Porter, of Mountain View, California. 'Called Disk/Trend Report' they will be completely revised each year and each pair can be supplied for $600 plus $50 for each copy.

According to the hard disc drive study, 70% of the $1,876 million worth of rigid disc drives shipped worldwide in 1976 were produced internally by systems manufacturers. OEM manufacturers accounted for $250 million worth, and plug compatible manufacturers about $254 million, or 14%. However, the PCMs' share of total shipments is predicted to decline to 10% by 1980.

Fixed media hard disc drives will show by far the biggest increase in sales between 1976 and 1980 — from $307 million to $1,588 million.

For each type of disc drive the report provides information on prices, shipments, installed populations, market shares and different channels of distribution.

The 80-page Disk/Trend Report on the floppy disc market provides most of the basic technical details of models available from US and European manufacturers.

Three other sections discuss in detail marketing and technical features and prospects for 8-inch one-sided, 8-inch two-sided and 5.25-inch drives.

Tables list the revenues that are expected to be generated each year up to 1985 for each type of drive and by different types of manufacturer in the US and Europe — IBM, other mainframe companies and independent OEMs, etc.

'Disk/Trend Report' is available by subscription. James N. Porter & Co, Disk/Trend Report, 1017 Hamilton Court, Mountain View, California 94040, USA.

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Practical public-key cryptosystem simply explained

Last week Donald Davies, superintendent of the division of Computer Science at the National Physical Laboratory, discussed a recent development which could change the nature of cryptography. Here he explains the principles of public-key cryptography with a simple example.

The National Computing Centre is to hold a seminar on data protection by cryptography in London on September 28.

By Donald Davies

IN my first article (CW, September 15), I described the public-key cryptosystem and its importance for cryptography and authentication. The need to transport keys in secret is avoided and authenticated messages cannot be forged by the authorised receiver.

The first news of a practical public-key cryptosystem in the August Scientific American concerns one invented at MIT by Rivest, Shamir and Adleman. I will try to explain it by means of an example of manageable size. They start with two very big prime numbers p and q. For their "test piece" they have one number of 64 decimal digits and the other of 65. It is not too difficult to find such large primes. When you set up a cryptosystem in order to receive messages you do not reveal the values of p and q, because they are part of your secret key. You reveal instead their product pq, which in the Rivest example has 129 decimal digits. This is part of the "public key."

To illustrate the method, I propose to use two much smaller primes and to reveal to you their product, which is 55. Hardly a one-way function, because you know that I started with 5 and 11. To factorise the 129-digit number into its primes would take, we are told, 10^{16} years on the fastest computer! The cryptosystem depends essentially on the infeasibility of these calculations.

The second part of the public key is a number s, which in the published example was 9007. For the value of s we shall use 3. This quantity must be prime to the numbers p-1 and q-1, meaning that it must have no factors in common with them.

The process of encryption is very simple. It uses modulo 55 arithmetic, which means that all numbers differing by multiples of 55 are equivalent (the technical expression is congruent modulo 55). So the best plan is to use only the numbers 0, 1 . . . 54 (residues) and reduce all bigger numbers to these by removing multiples of 55.

Adding and multiplying in this way is easy. You do ordinary arithmetic and reduce the result to its residue.

The message we are enciphering is, let us say, a binary string and we divide it in blocks so that each one is a number in the range 0 to 54 inclusive. This is a hopelessly small block for enciphering. Once again our small example reveals its triviality. No matter; the real one is more than 400 bits long.

All we do to encipher a message m is to raise it to the power s. For example, the message 4 enciphers as $4^3 = 64$ and the residue is just 64-55 = 9. This calculation can be done by anyone, because the modulus (55) is made public and so is the power (3). Table 1 shows how all the values of the message would encipher. Note that all the cipher values are different. This was ensured by having s prime to p-1 and q-1. It is very fortunate, since we want to invert the function.

Number theorists will not be surprised to hear that this can be done by raising the cipher message to the power 7. In our example $9^7 = 4782969 = 55 \times 86963 + 4$, so the residue is 4. To non-number theorists this may seem like magic.

There is no need to use such big numbers in the calculation, because each step can be followed by reduction to "residue" form. This matters a lot when residues themselves are 129-digit numbers. There are short cuts for calculating the big powers, such as repeated squaring to get the 2nd, 4th, 16th, 32nd powers, etc from which others are rapidly built up. With tricks like these, the 9007th power with the big modulus, we are told, takes less than a second of computer time.

Table 2 shows the seventh power of all the values of the cipher message, and this can be seen to invert the function of Table 1. You may also note a number of special cases in both tables in the first, second and last columns and in the multiples of 5. If the cryptanalyst happened to chance on these values, it might reveal to him the secret p and q, but in the big numbers game the chance is very small.

Why does it work, and how was the number 7 chosen? The inversion is possible because the two functions together raise a number to the 21st power. For any value of m, the 21st power equals m. The deciphering power t which gives st this property can only be calculated be someone who knows p and q. What one does is to calculate the least common multiple of p-1 and q-1 which, for our example, is 20. Then one finds the value of s by solving the equation (congruence) st = 1 in modulo 20 arithmetic.

Number theorists find little difficulty in solving such "equations." The conditions we laid down for the value of s ensure that it has a solution. For big numbers there is a lot of choice of s and t. It would not be wise always to choose s so that t is small, because the cryptanalyst might exploit your preference. Remember that s is part of the public key, but t is kept secret.

A practical system requires both convenience and security. On present appearances the new cryptosystem is not easy to program, and not very fast in operation (a few hundred bits per second). To find out how secure it is you have to ask an expert in number theory. The history of crytography is littered with fallen ciphers, so nobody should pronounce this cipher unbreakable, even in the limited sense described, until the theory of computational complexity becomes adequate to prove it.

With a cipher of such simple structure there is perhaps a better chance for a theoretical basis of cryptography and cryptanalysis. It is certain that there will be many new cryptosystems of the same kind — it is said that some are being patented in US.

Even a rather slow algorithm could be very useful for the authentication role which was described last week. It could also be used to convey a key in order to set up a secret conversion using a more conventional cryptographic scheme such as the US government's Data Encryption Standard.

x	0	1	2	3	4	5	6	7	8	9	10	
0	0	1	8	27	9	15	51	13	17	14	10	
11	11	23	52	49	20	26	18	2	39	25	21	
22	33	12	19	5	31	48	7	24	50	36	43	y
33	22	34	30	16	53	37	29	35	6	3	32	
44	44	45	41	38	42	4	40	46	28	47	54	

Table 1: $y = x^3$, modulo 55, encryption

x	0	1	2	3	4	5	6	7	8	9	10	
0	0	1	18	42	49	25	41	28	2	4	10	
11	11	23	7	9	5	36	6	17	24	15	21	
22	33	12	29	20	15	3	52	39	35	26	43	y
44	22	34	40	31	38	47	19	50	46	48	32	
44	45	51	33	27	14	30	8	13	37	44	54	

Table 2: $y = x^7$, modulo 55, decryption

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MYRIAD APPOINTMENTS LIMITED
Computer Personnel Consultants

SENIOR S & P VACANCIES

NEW 2960 INSTALLATION
S.W. LONDON

A major Group of Companies whose Head Office is situated in S.W. London, easily accessible by all forms of transport, are scheduled to install a new ICL 2960 configuration.
A comprehensive plan of Systems and Programming activities for the new machine has been established with board level approval.
A number of key personnel are now required at a Senior level to take responsibility for major applications within an environment offering both challenging assignments and positive career prospects to the successful candidates.

SENIOR SYSTEMS ANALYST TO £6750

In charge of a design team of Analysts and Programmers, the person appointed will initially be responsible for the development of a large T.P interface to all batch systems followed by user education and implementation.
The ideal applicant will have extensive analysis and project experience in a teleprocessing environment. A flexible outlook and awareness of business issues coupled with a user oriented bias is a prime requirement for success in this role.

SENIOR ANALYST/PROGRAMMERS
£ EXCELLENT

Joining a technically stimulating and progressive department, candidates will receive formal training in key areas of large 2900 development. Having attained senior programming levels candidates should have good COBOL experience and be familiar with 1900 software. An interest in commercial and financial systems would be ideal and whilst gaining advanced technical expertise the persons appointed will be encouraged to develop their skills in analysis.

All positions have an attractive benefit package including Flexitime, four weeks' holiday, LVs and Pension Scheme.

Please telephone for a confidential discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 5868

ON APRIL 21ST WE BOOKED THIS SPACE

ICL Dataskil
Recruitment Service

What did so many software people see in it?

It was just a quarter page ad in the computer press. Yet it pulled a record number of applicants at all levels. However even this response wasn't enough to keep pace with the requirements of our rapidly expanding software house, already the largest in Europe.

This is what we said.

"Move into or develop your career in systems software. We are looking for staff at all levels - Software System Designers, Consultant Programmers, Senior Programmers and Programmers, to work in areas of Basic Software, Scientific and Technical Applications and Packages, and other non-commercial applications. Some of the projects could well take you overseas for short, or if you wish, long stays.

You must have at least 12 months' Assembly-level experience on any machine, any experience with high level languages or communications or real-time would be useful but is not essential. For the more senior appointments we are looking for experience in at least one major project where you carried some of the leadership/management responsibility."

We'd like to repeat that salaries are in the range £3000-£6000 and we'll help with relocation expenses where appropriate.

So if you were not able to apply last time, then apply now.

Phone David Richardson on Reading 581258 extension 8, or ask his secretary for an application form. Or write to Dataskil Limited, External Services, 93/99 Upper Richmond Road Putney London SW15 2TG. Please quote reference CW107

ICL Dataskil
Recruitment Service

South Eastern Health Board

COMPUTER STAFF

The Board invites applications for the following permanent and pensionable posts:

(1) SENIOR PROGRAMMER
to lead the Board's programming staff.

(2) ANALYST/PROGRAMMER
to assist in the development of systems.

Applicants for either post should have at least 2 years' programming experience in COBOL in a 1900 or 2903 installation and must not be more than 27 years of age on 1st September, 1977.

Salary on a scale rising to £4,628 p.a. £4,796 from the 1/11/1977. Starting point of scale depending on age.

Closing date: 5 p.m. on Wednesday, 5 October, 1977.

For further details and application forms, write to the Personnel Officer, Arus Slainte, Patrick Street, Kilkenny, Ireland.

QRH COMPUTER RECRUITMENT

N.E. ENGLAND

PROJECT MANAGERS TO £8000. Large I.C.L. installation requires Production Control Specialists with Man Management experience On-line and Real Time developments

ANALYST/PROGRAMMERS TO £4750. Mainly new posts in Manufacturing Areas. Cobol background, preference for I.C.L. machines.

OPERATIONS CONTROLLER £4250. IBM 370/145. Batch Processing. Interactive Systems, CICS, running under DOS/VS or Power/VS, must have Man Management experience. Full relocation package.

YORKSHIRE

IBM PROGRAMMERS TO £150 P.W. 9 Month Contract min. age COBOL + CICS and/or DLI experience

ANALYST/PROGRAMMERS TO £4750. IBM/COBOL/DLI. Manufacturing Division of International Company. On Line System career progression.

ANALYST/PROGRAMMER £4500. Mini Computer experience in Interactive Systems, opportunity to gain experience of Database and Time.

MANCHESTER

ANALYST/PROGRAMMER TO £4500. Major Insurance Company have a sound commercial or Accounting System background with COBOL would be useful, first-class working conditions in a new Company

GRADUATES wanting a career in the Computer Industry must be meeting people and have a good degree classification, logical drive mind essential

QUEENS ROAD MILLS, QUEENS ROAD, HALIFAX, HX1 1LR. TELEPHONE HALIFAX 0422 68232

CAPITAL APPTS.
39 Percy St. London W.1.
FORTRAN Experienced and Trained Programmers
Urgently required, for industrial and scientific development.
£3000-£5500
ALL AREAS
Visits to the Isle of Wight
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Personnel Consultants

MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

SALES — Total Earnings £10K + Car
LONDON

Following its 3-year success in Europe the largest independent bureau in the world is now expanding and setting up an operation in the U.K. They are looking to recruit experienced sales people to sell their batch processing accounting systems and in particular a payroll package. As this is a new venture, there is the added attraction of promotion to sales manager, within a year, for the right person. A comprehensive training course and extensive back-up in terms of advertising campaigns and mail shots are planned to ensure the success of this project.

Contact Faye Ogilvie.

SALES SUPPORT — to £7200
WEST LONDON

Technical Advisers are required by our client, a world-wide mini computer manufacturer to work in pre and post support roles. To qualify for these positions, certain attributes are necessary. They include the ability to communicate effectively, an outgoing personality and experience in commercial programming and systems analysis. Preference will be given to those with experience in project management. The successful candidates will be involved with a wide range of commercial applications for a variety of users.

Contact Peter Gorton.

SUPPORT ANAL — £6K
CENTRAL LONDON

The ability to establish a close working relationship with users is essential for this role. Our client requires a responsible person capable of acting independently to co-ordinate the systems and programming support required by their users. Liaison with both manufacturer and software house will be necessary to ensure this. You will also be responsible for the analysis of new system requirements. Commercial experience gained on mini computers is essential, priority will be given to those candidates with real time systems experience gained on DEC equipment.

Contact Pam Quinlan

PROGRAMMER Neg.C. £3,750
CENTRAL LONDON

A NEAT 3 programmer, preferably in his/her early twenties with a minimum of 9 months' experience, is required by our client, The installation is comprised of a disk based NCR 75 computer which provides management, financial and computer services to the motor and finance industry. Candidates' initial duties would include writing new programs, amending existing programs and maintenance work, on a fairly even proportion. Career progression into systems analysis and/or management is actively encouraged. Starting salary would be negotiable depending on age and experience.

Contact Rowland Middleton.

LECTURER — £4½-5½K
DUBLIN

Two years' commercial DP experience and a knowledge of IBM COBOL are all the qualifications required for this well paid, rewarding role. Our client, the largest independent software house in Europe operate an established training school, which specialises in giving courses to foreign nationals. They currently require a self-motivated, presentable person to give their introductory level courses. Essential personal attributes are the ability to communicate ideas clearly and carefully. This is a unique opportunity for someone either living in Eire or wishing to move there. Assistance with relocation expenses will be given and travel at a later date is a distinct possibility.

Contact Pam Quinlan.

Area SALES Manager — Basic to £7K
LONDON EAST
Quota Earnings £12K + Car

The vital qualifications for this position are an excellent and unbroken personal success record in sales, experience of sales management and a thorough knowledge of the bureau or mainframe market. Our client is a major force in the bureau market offering a wide range of services including commercial and scientific packages, custom built systems, time hire, etc. This is a newly created position brought about by the increasing demands for the bureau services and resulting expansion.

Contact Faye Ogilvie.

SALES — Quota Earnings £10K + Car
LONDON/B'HAM/M'CHESTER

Our client, always in the forefront of the mini computer manufacturing field, is aiming to further their success by the expansion of their sales team. They are currently seeking experienced sales people with considerable knowledge of commercial systems and a good sales record, to sell in the areas listed above. The realistic target makes the quota earnings within easy reach and the consistent growth of the company allows scope for career development.

Contact Faye Ogilvie.

PROJECT MNGR. — to £7K
MANCHESTER
+ Car including Bonus

An experienced team leader is required by a mini manufacturer to lead a project team of 4 people, increasing to 12 within a few months. The successful candidate will be one of three managers in the Systems Development Group, which is self-supporting within the company. He or she will be involved with all aspects of the work, both technical and managerial, and be able to meet financial targets in a very competitive environment. Only ambitious, strong-minded people with commercial systems and Assembler level programming experience need apply.

Contact Rowland Middleton.

PROGRAMMERS — to £4200
HERTS.

COBOL Programmers are required by our client, one of the leaders in the retail/distributive industry, to develop and maintain a wide variety of projects including communications and commercial systems. They are a well established 1904S installation — which will be upgraded in the near future to a new line of sophisticated hardware — and desire candidates to have at least 18 months' experience. A knowledge of PLAN would be a distinct advantage. There is a lively working environment and an active social life using their sports and social facilities.

Contact Rowland Middleton.

W'SHOP SUPER. — £5K
S. KENSINGTON

Five years' computer or peripheral experience gained in either the workshop, factory floor or field engineering environment is desirable for this position. Our client, a major supplier of computer peripherals, require someone to control and monitor the throughput of their small but expanding workshop team. You will also be required to provide technical assistance on PCB, electro mechanical and general machine repair. This is an excellent opportunity to move into a supervisory position and still maintain technical involvement.

Contact Peter Gorton

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611
MANAGEMENT & EXECUTIVE SELECTION

SENIOR CONSULTANT AND SYSTEMS CONSULTANT

Salaries up to £7000 p.a.

What motivates you most about your job?

If your primary considerations are environment, working for a company with an excellent reputation in its field, the opportunity to contribute to the company's growth, and this effort and interest rewarded with management responsibility at an early stage, then these positions could be of interest to you.

Our client is young, dynamic, and well established, very pleasantly located on the Surrey/Hampshire borders within easy access of the M3. Specialising in certain sectors of industry, they have achieved a sound foundation based on first-class service to clients. They have exercised a carefully controlled plan of growth without losing sight of short and long term objectives. They are looking for men and women to join them in their systems area, who are seeking a planned long-term career.

Senior Consultant

Applicants must have a sound commercial and business systems background. It would be an advantage to have been involved in computing, and have a knowledge of computer hardware, preferably IBM and/or minis but this is not essential. Candidates must have the ability to liaise with senior management and clients. Ref. 779.

Systems Consultant

A computer background in systems and programming is necessary, with a particular emphasis on commercial systems. Additionally, a key function will be liaison with clients, therefore, applicants must be personable and communicate well. Ref. 780.

In addition to excellent salary remuneration, the company offers free life assurance and a non-contributory pension scheme.

Please contact Corinne Ingram, quoting appropriate reference no.

WE ARE ALWAYS INTERESTED IN HELPING *YOU* WITH YOUR CAREER

John Goldsmith (Computer Recruitment) Ltd., 15, Buckingham Palace Road, London, S.W.1.
Tel: 01-828 5356–24 hour answerphone service.

JOHN GOLDSMITH (Computer Recruitment) Ltd.

SALES APPOINTMENTS

NORTH WEST

MINI COMPUTER SALES

Quota earnings 10K
+ car
(Base salary 5K)

Our clients manufacture a highly competitive range of commercial mini computer systems that are fully supported by comprehensive software and engineering facilities, and growing acceptance of their products in the market place has led to an expansion of their sales force in the North West.

They are therefore seeking candidates who will be able to demonstrate a successful track record in selling small computer systems, VRCs, accounting machines or bureau services to the first time user market.

Our clients offer a high basic salary, two litre company car and the security of working for an established and well funded company.

Contact: TONY DEAN on 061-833 0676. Ref. 77/09/14

MIDLANDS

BUREAU SALES EXECUTIVE (TIMESHARING SYSTEMS)

Base 4/5K
+ quota bonus to 9K +
and company car

Our client is a market leader in network services, the fastest growing sector of the computer services industry.
The company's reputation, product line and growth plans are excellent and it is well established with a Birmingham branch operation.
For a prime West Midlands territory, we are retained to recruit an experienced sales professional.

Candidates should have:
- ★ Experience of the time-sharing, bureau sales or business systems markets in a direct sales capacity.
- ★ A definite sales personality to accompany a strong track record in selling.
- ★ Aged 25/40.

This is the first opening with our established client in its Midlands operation, and affords an excellent opportunity for real career growth in both financial and responsibility terms.
Contact: PETER RIGBY on 021-236-3781. Ref. 77/09/15.

SCR

SPECIALIST COMPUTER RECRUITMENT LTD.
BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD
LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

Computing Services Association

HAWKER SIDDELEY

Brush Switchgear Limited

COMPUTER PROGRAMMER

We are amember of the Hawker Siddeley Group, twice winners of the Queen's Award for Export achievement, and we require a Programmer to join our small systems team who are currently developing on time systems using TPS.

The ideal applicant will be a self-motivating person with experience of COBOL programming preferably on the ICL 1900 range. A knowledge of real time systems programming would be an advantage

Applicants, male or female, should write to or telephone: Mr. R. Newton, Personnel Officer (Employment), Brush Switchgear Limited, P.O. Box 19, Falcon Works, Loughborough, Leics. LE11 1HL. Telephone: Loughborough 63131 Ext. 489.

1976 1977

TWO SENIOR PROGRAMMERS

Up to £4,000 plus bonus

TYLIN MANAGEMENT SYSTEMS LTD. is an expanding computer software house and bureau which is part of an international organisation offering security, good fringe benefits and modern office accommodation. At our Croydon office we operate an I.B.M. 370/145 computer with DOS/VS and GRASP.

We are looking for competent COBOL programmers with at least 2½ years' experience, preferably with another language and experience of supervising other programmers.

INTERESTED in a job with challenge then why not write giving brief details of career to:

J. M. Fennell
Tylin Management Systems Ltd.
Leon House
High Street
Croydon CR9 3NH

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

INTERNATIONAL PROJECTS

DEVELOPMENT STAFF — W. LONDON

A worldwide privately owned Company with major offices in London, is currently expanding its computer team to assist in developing a range of technically advanced applications projects.

The Company has substantial high-technology operations in some twenty-four countries throughout the world and is a major user of computer facilities. Its diverse activities lead to a considerable range of computer projects all of which are supported by keen user involvement.

The D.P. section works to highly professional standards and is continually seeking to assist user performance with the latest hardware and software developments, particularly in the areas of database and telecommunications for which formal training is given.

Vacancies exist at various levels and offer computer professionals an outstanding opportunity for career advancement.

PROJECT LEADER — c £7000

To initially take responsibility for the co-ordination of a large Materials Control System using database and communications techniques. The Project Leader will hold budgeting, scheduling and implementation responsibility and play an active part in technical analysis and design. A solid computing background including supervisory experience coupled with an interest in good standards and structured programming is required. Whilst not essential, an understanding of COBOL and UNIVAC or IBM equipment would be ideal.

ANALYST/PROGRAMMERS — £4250 to £6250

Analyst/Programmers at all levels will have the opportunity to play a major part in varied development projects. A flexible approach and desire to be involved in business applications offering user contact is essential. Applicants should have good COBOL experience preferably gained on large UNIVAC or IBM equipment.

Excellent conditions are enhanced by a system of flexible working hours, Non-Contributory Pension, LVs and Season Ticket Loans.

Please telephone for a confidential discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 5868

PDP-11 SOFTWARE

LONDON - WEST END

Elida Gibbs Ltd., part of the Unilever Group, is currently developing real-time systems for warehouse control and logistics purposes using a network of eight large PDP-11 computers. These run under IAS and RSX-11, and will be linked to each other through DECnet and also to an IBM 370/138 TOTAL is used for finance management.

PROJECT MANAGER

The Project Manager will take charge of developing the subject required to operate the network. This is a senior position and candidates should possess:

- *a background of around 5 years of software development*
- *in depth knowledge of both the PDP-11 and RSX-11 range of operating systems*
- *experience of project and team leadership, and the ability to command the respect of colleagues.*

SOFTWARE SPECIALISTS

To work within the software team both on design and implementation. Candidates should possess:

- *a background of at least 2 years in software development*
- *at least 6 months of programming in Macro on the PDP-11 system, preferably under a RSX-11 operating system*
- *a high degree of self motivation*

A substantial starting salary will be paid to either of the above candidates, and prospects of advancement are very good.

If you would like to know more about these first-class openings, please ring us, quoting the reference.

Tel: 01-637 5796

EDP Systems
52-53 Margaret Street
London W1N 7FF

SENIOR OPERATOR

Twelve hour shifts for ICL installation in West London. Two years + experience with George II and George II+.

Salary: £3500+

OPERATOR

IBM 360/50 machine running under OS MVT HASP. Preferably two years experience for a Middlesex installation with a three shift system.

Salary: £3750

SENIOR OPERATOR

Eighteen months + experience with George III. Three shift system. ICL 1900 installation. Herts Co.

Salary: to £3800

OPERATOR

Two years + experience for Essex installation with IBM 370 running under DOS/POWER/VS. S/C and free lunches. CICS experience helpful

Salary: £3500

IBM OPERATOR

IBM 370/125 installation in Essex require eighteen months + experience with DOS/POWER/VS. Four shift system

Salary: £3437

SHIFT LEADER

Two shift system ICL 1904A installation. Knowledge of George II and George II+ preferably three years experience. Surrey area.

Salary: to £3800

STAFF!

LOOKING FOR JOBS?

These are just a selection of vacancies we have available. Telephone Avril Lively for more information about these and others

01-402 0933

SHIFT LEADER

Age 20+. Three years + experience with IBM 360/50. Three shift system. Previous experience as a shift leader. OS/MVT/HASP for Middlesex company.

Salary: to £4500

ICL OPERATORS

N.W.1. installation require operators with George II+ for a four shift system — ICL 1900.

Salary: £3000

COMPANIES!

LOOKING FOR STAFF?

Telephone Avril Lively our branch manageress who will take details of the job you have available

01-402 0933

IBM OPERATORS

East London company require at least eighteen months experience on IBM 370/DOS. Two shift system + perks.

Salary: £3600

ICL OPERATOR

N.W.9 company require experience on 2903 or 2904. Two shift system. S/C minimum of eighteen months experience

Salary: £3600

IBM OPERATORS

Up to eighteen months experience with OS/VS1. Two shift system for an Essex installation

£c3000

DATA CONTROL CLERK

Five day week — 9-5. Bonus. To work in Data Processing department with accounts, purchase ledger, etc. Mid 20's.

Salary: £3000+

ICL OPERATORS

Two shift system, nine months + experience for a West One company. Preferably experience with ICL 1900 machines. I.V.

Salary: £3-£3500

HAVE YOU—

Three years + operating experience? Will you work a three shift system? Most important do you have DEC 10 experience? If so call Avril Lively for more details.

AJK RECRUITMENT LIMITED (Emp. Agy.)

26 Chilworth Street, Paddington, London, W.2 **01-402 0933**

AJK

JBA

Minicomputer Sales

South of England **c. £10,000 + car**

A well known and successful minicomputer manufacturer has opportunities for Sales Executives to join a well established team. Candidates must have at least two years' experience of selling computer hardware in the commercial market. A background in data processing or accounting would be an advantage.

Our clients offer a high basic salary and an excellent commission scheme which will enable professional sales staff to earn in excess of £10,000.

Salaries negotiable, company car and other large company benefits.

Contact: Jim Baker

Field Service Engineers

Central London
up to £5,500 + London Allowance and car

Experienced resident engineers are required for a prestige installation in Central London. The engineers must be capable of installing new equipment and systems, carrying out preventative maintenance, be conversant with diagnostic software and have the ability to communicate with customers at all levels. The successful candidates will be expected to undergo a number of weeks' formal training to achieve the level of expertise required. Experience in servicing large disc-based systems is mandatory.

An excellent salary is offered plus generous shift allowance, and overtime rates.

Contact: Margaret Stevens

Technical Authors & Engineers

Attractive opportunities in many parts of the country

Contact: Mike Creamer

Technical Sales Engineers

London, H. Counties, E. Anglia **on quota £7,500 + car**

Opportunity to join company in DP support industry to open up new areas and further develop existing client requirements. The variety of services include industrial maintenance, humidification equipment, centralised lubrication systems, and security. Preference will be given to sales-minded Engineers who have had experience with heavy machinery and plant. Ideal for people living Herts or N. London area.

Attractive base salary and commission scheme.

Contact: Mike Creamer

COBOL Programmers

London & Berks **up to £6,000**

Our client, one of the leading consultancies in the country, has vacancies for programmers at all levels.

Applicants should have at least twelve months' experience for the junior positions and several years for the more senior posts. A background of COBOL in financial applications, particularly payroll, is desirable.

The client can offer challenging projects in a truly professional environment.

Excellent salaries and fringe benefits.

Contact: Jim Baker

Systems Programmer

Herts **to £5,500**

A well established and expanding manufacturer wishes to appoint a software programmer whose main responsibility will be for the development and enhancement of executives and telecommunications software. It is essential to have a sound academic background in a scientific subject, preferably in computer science or electrical engineering and have spent at least three years working in a systems programming environment. Knowledge of a communication system would be an advantage.

Relocation expenses will be paid as necessary.

Contact: Margaret Stevens

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES
International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

STRATHCLYDE REGIONAL COUNCIL

GLASGOW SUB REGION
Department of Roads

RESIDENT ENGINEER

Post No. GW/RDS/80/1. Grade A.P.V. £4648-£4998 + supplement of £820 per annum.

Located at Broomlaw Computer Traffic Control Centre, Glasgow.

Research into area traffic control by computer is undertaken in Glasgow by the Transport and Road Research Laboratory through an arrangement with the Regional Council's Director of Roads. At present 80 junctions in the city centre are controlled by computer, and a feasibility study is under way to assess the city's future requirements for control of traffic by computer.

The current responsibilities of the Resident Engineer at the centre are as follows:

a) Research into on-line and off-line methods of traffic control in association with the TRRL. This includes contributing to specific research projects, assistance with large scale journey time surveys and with setting up experiments in Glasgow.
b) Programming the on-line computer system for research work and updating the existing operating system.
c) Ensuring that the computer system and the traffic on the street network within the city centre are running efficiently.

Candidates must have a degree in civil electrical or electronic engineering. Experience in area traffic control systems and/or traffic management is desirable but not essential.
Application forms may be obtained from the Assistant Director of Manpower Services, 21 Gordon Street, Glasgow G1 3PS, to whom completed forms should be returned by 14th October 1977.

R. M. O. McCULLOCH
Director of Manpower Services

Senior Systems Analyst

£5847-£6532 inc.

An opportunity in the project team for an experienced systems analyst to work on payments and housing systems. Responsible to Project Leader for analysis, design, implementation and maintenance of systems, and for adherence to work targets. Applicants (prof under 40) must have min. 3 years' computer systems experience and have completed on target at least one major system. Must be able to lead a team of 3 to 9 staff. The Authority operates under George 3, a 160K 1903T with EDS60s, fast tapes, 7502 terminals, and has a wide-ranging development programme of on-line and batch applications. 35 hr. week (flexible hours), 28 days' annual leave plus 9 statutory days. Written applications by 29 September to: Computer Services Manager, Town Hall, London SW18 2PU

LONDON BOROUGH OF
Wandsworth

Systems Consultants £6,000-£9,500

CENTRAL LONDON

Seven large well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require a first rate service. Technical communications consultants are also required where in-depth implementation experience of IBM or ICL T/P message switching networks etc., are essential. Excellent fringe benefits and prospects.
CW 38/1 Michael

Operators to Shift Leaders £2,000-£4,000 (incl.)

LONDON & HOME COUNTIES

We have many vacancies covering all types of machines and locations. Some firms will refrain from one manufacturer to another. Remember these positions are for shift-working only. Hurry whilst stocks last.
CW 38/2 Annette

Junior Programmers £2,500-£3,750

LONDON, HOME COUNTIES

Only one year's experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you.
CW 38/3 Annette

Contract Programmers to £190 p.w.

U.K.

Immediate requirements for IBM COBOL under DOS or OS for C. London. PL/1, OS or CICS, PDP/11 or good IMS for various locations for 3 months plus. Also IBM vacancies in GERMANY, FRANCE, BELGIUM & HOLLAND. Ask for the Contracts Officer on 01-995 2236.
CW 38/4 Michael

Time Sharing Programmers to £6,000

C. LONDON

If you have had time sharing experience involving the use of FORTRAN, BASIC or ASSEMBLER, then we have four nationally known companies who would offer you an exciting job in pre- or post-sales support. Some offer generous bonus schemes.
CW 38/5 Michael

Successful Salesmen to £12K quota earnings

U.K.

We now have ten different firms for both hardware and systems only companies who are anxious to meet successful salesmen in this industry. They must have previous relevant small systems experience (some VRCs will be considered). All firms have bonus schemes and cars or car allowance. Most positions in S.E. England, but 2 in Midlands.
CW 38/6 Michael

Mini Computer Programmers to £6,950

U.K.

Your experience is required now. A very large number of vacancies are registered where a knowledge of Assembler or communications experience is essential (VRC programmers would also be considered). Opportunities exist in S.W., N.W. or W. London, Surrey, Herts, and Manchester in this exciting and rewarding field. There has also been registered some overseas posts to people with 5 or more years in mini computers.
CW 38/7 Michael

UCA

DATA EXPRESS HOUSE
PROSPECT PLACE
HEATHFIELD TERRACE
CHISWICK W4 3BR
Recruitment Consultants
01-995 3883 or 01-958 6138 evenings

AUSTRALIA

N.R.M.A. is the Motorists' organisation for N.S.W. and has 1.2 million members. As well as the provision of the usual motoring services, our operations include Insurance, Finance, Travel and other motoring-related activities. Our Data Processing facilities are located in a modern, airconditioned building in the centre of Sydney. We require:

SENIOR SYSTEMS PROGRAMMER

with considerable experience in teleprocessing networks under CICS. Salary around A$16,000.

SYSTEMS PROGRAMMER

with experience in any of the following — DOS/VS, VM, CMS, CICS, DLI. Salary around A$14,000.

PROGRAMMERS

who will possess considerable experience in COBOL and/or Assembler, preferably on IBM 370 computers, and will have the choice of being trained for systems programming or joining the applications programming group with a career path into systems analysis. Salary to A$13,000.

Suitably qualified applicants with a genuine interest in emigrating to Australia should write, giving a telephone number at which they can be contacted during business hours and including full details of education, employment history and references, to:

JOHN GOSNEY
43 UPLANDS CRESCENT
FAREHAM, HAMPSHIRE

by 10 October, 1977. Interviews will be held in London in the week ending 11 November, 1977. Applicants are advised that eligibility for immigration to New South Wales requires at least 3 years' practical experience, plus suitable educational qualifications.

H.P.S.L. ..... H.P.S.L.

P
S
L

SWEDEN
FREELANCE PROGRAMMERS
IBM COBOL/ASSEMBLER
with HONEYWELL LEVEL 6 in background
Urgently required for customers in and around Stockholm
Tel. Amersham (02403) 22201

H.P.S.L.

Salary up to £10,000 p.a. or more!

Systems Programmers

Come and talk informally with IDEC– You could hear something to your advantage

IDEC, the Design and Development Centre of ITT Business Systems and Communications Group is responsible for the major software development activities of the new products marketed by this worldwide group.

We can offer you:

- 'State of the Art' Software developments in:
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  - Software Engineering
  - Microprocessors
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  - Compilers
  - Data Communications
- A relaxed professional work environment on London's Green Belt, (current locations are Cockfosters, Potters Bar and Sidcup).

We are only looking for the *best* software professionals, people dedicated to improving the software development process and expecting to be justly rewarded for it.

We recognise potential at all levels, good programmers with one year's experience, high flyers in their twenties, right up to the seasoned software veteran at the top of the ladder.

It might surprise you to find out just how much we value your software expertise.

We'd like to tell you more about the opportunities currently existing within IDEC. Why not come along and talk to us over a drink!

If you cannot come along on these dates, then telephone us on Potters Bar 44137, or write to:

Mr. J. Healey, Personnel Manager,
IDEC, Canada Life House,
Potters Bar, Herts.

Come along to:
Canada Life House
High Street
Potters Bar, Herts.
on Tuesday September 27th
or Wednesday September 28th
between 12 noon and 9.30 pm.

IDEC

JBA

Systems Programmer

London-Essex border **circa £5750**

A well known manufacturing company have an excellent opportunity for an experienced Systems Programmer with an IBM 370 DOS background and, ideally, knowledge of SHADOW and DBOMP. The position will involve responsibility for the entire software of the installation, dealing with all levels within the DP department, and liaising with outside suppliers of hardware and software.

Applicants must have had formal training as a programmer and of operating systems and TP monitors. They must be self-motivated, capable of working without supervision, and have high organisational abilities. The work will particularly suit someone with imaginative and inventive skills.

Company prospects, relocation package and general benefits are excellent, together with regular status and salary reviews.

Contact: Mike Creamer,
James Baker Associates,
International Personnel Consultants,
16 Maddox Street,
London, W1.
Tel: 01-491 4478.

COUNTY DURHAM

SYSTEMS ANALYSTS/ PROJECT LEADERS

Salaries in a range to £6,500

You may be called a Systems Analyst, Senior Analyst or Project Leader, but have you the ability and experience to play a responsible role in our clients programme of challenging systems development?
You should have designed and implemented at least one major system showing positive achievements in the production or stock control areas, and have the ability to communicate, and motivate others.
A programming background and ICL TP experience will be advantageous, particularly for the junior positions.

In return for your skills our client offers:

- ★ a highly competitive salary
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CONTACT TONY DEANE
ADVISING CONSULTANT 061-833 0676 REF. NO. 77/09/24

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LONDON 01-935 0671 FREEPOST 6
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Promotion and development have created opportunities in Key Markets' Computer operations for 2 Senior Operators to work on DAYS AND EVENINGS ONLY. The installation is an IBM 370/135 (DOS/VS: POWER/VS: CICS/VS).

Progressive development and transfer of the company's systems on to the 370 has created an absorbing and varied working environment which is spacious and a totally new establishment.

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KEY MARKETS LIMITED
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HAINAULT, ILFORD, ESSEX
Tel: 01-500 1080 or 8114

Senior Programmer

Manchester Area. c. £4,000 p.a.

Our client wishes to appoint a Senior Programmer with COBOL experience. The successful candidate, male or female, will be involved with the development of on-line systems using ICL 1900 Hardware.

The position offers excellent career potential with training in communications based systems. A competitive salary, around £4,000, will be paid according to experience.

This Company, part of an international Group, offers excellent working conditions and benefits are those normally associated with a progressive organisation.

Please write with full career details listing any companies to whom you do not wish your application sent and quoting reference number 525 to:

Riley Management Selection (Services) Limited,
Queens Chambers, 5 John Dalton Street, Manchester M2 6ET.
A member of the Rex Stewart Group.

LONDON BIRMINGHAM BRISTOL EDINBURGH GLASGOW
LIVERPOOL MANCHESTER NEWCASTLE NOTTINGHAM

Riley

SENIOR SYSTEMS ANALYST

LONDON W.1. £6250/£6750

This is an opportunity to take a key role in the development of new information systems — real time, database and batch concepts.

Responsibilities will include:

- *feasibility studies and outline systems proposals with associated cost and resource estimates, implementation plans etc.*
- *assistance in the evaluation and procurement of hardware*
- *presentations to users*

This career opening will interest Senior Analysts with

- *both on-line and off-line experience (knowledge of communications equipment, terminals, and complex Data IO would be valuable but is not essential).*
- *enthusiasm and the ability to implement practical (though novel) applications.*
- *upwards of five years' data processing background, including significant period as a systems analyst or designer.*

The environment offers the opportunity to work to good professional standards and to develop knowledge of sophisticated techniques. Training will be given where appropriate. No travel is required.

We have been retained by clients to advise on this career opening. Please ring us for a confidential initial discussion, quoting ref: 672, or write briefly.

Tel: 01-637 5796
EDP Systems
52-53 Margaret Street
London W1N 7FF

DP MANAGER (DESIGNATE)

Up to £5000 PA

This is an excellent opportunity for an experienced Computer Programmer/Systems Analyst looking to advance into DP management with a well-established manufacturing company based in the rural South West Midlands.

Data Processing systems are well established but there is ample scope for additional development.

You should have at least 5 years' experience in computer programming and/or systems analysis. Experience in RPG II and/or IBM System 3 equipment would be an advantage. Age 28+. Relocation expenses will be paid as required.

Contact: Ian Fyfe on 021-236 6971
PER Divisional Office, Fountain Court
Steelhouse Lane, Birmingham B4 6DS

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SALARY £8,000 + CAR
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The company is part of a large international organisation with a sound reputation in the computer services industry.

They are to expand the engineering services division and are looking for a sales professional with a background of computing and previous experience in areas such as petro chemical, electronics, network analysis, piping, stress engineering etc.
A qualification in engineering would be an advantage.
Phone immediately for a discussion and to arrange an appointment quoting reference CW182.

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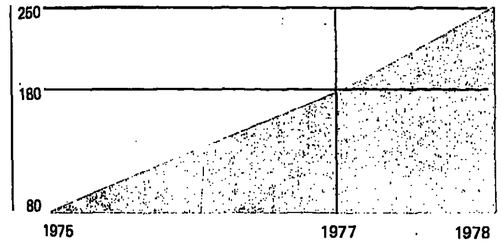
More! Still more!

We're growing as fast as ever in all aspects of our business. That means we need to continue expanding our Management Services Department based at Littlewoods headquarters in Liverpool. The Department already houses Europe's most ambitous Honeywell installation — plenty of ambitious computer professionals too. The graph shows how our programming and systems staff has increased to date, and how we intend it to grow in the next few years: years providing unrivalled career opportunities for computer people with the right experience.



To keep pace with this expansion we're busy setting up a complete, fully-equipped, in-company training school. That's how important computer development is to us. But in the meantime we need experienced computer people NOW. Since our successful recruiting drive earlier this year even more opportunities have arisen for the following staff :

Systems Analysts

Programmers

Data Base Analysts

Software Specialists

Communications/ Mini Specialists

If you're in one of these categories and you're keen to develop your career, there are three good reasons for doing it with Littlewoods.

(1) THE WORK: You'll be using the latest in advanced hardware (three Honeywell 66/80 processors 768k; thirty-two 200mb disk drives; sixteen tape drives; four line printers, and four Datanet communication processors, with 600 VDU's on line) and tackling a variety of interesting projects (real time order processing, merchandising, payments and warehouse control for six mail order companies; stock allocation and real time food distribution for 105 chain stores; plus the payroll and reporting services essential for an organisation 35,000 strong).

(2) THE SALARY AND PROSPECTS: You'll earn a very competitive salary with good fringe benefits and excellent career prospects within a successful and expanding organisation. (You'll be pleasantly surprised by local house prices too.)

(3) THE SATISFACTION: Satisfaction that comes from involvement in absorbing and stimulating projects which make a genuine contribution to the company's profitability.

These are opportunities no career-minded computer professional can afford to ignore. For further details just call in for an informal chat, with no obligations, at one of the venues listed opposite.

Greater London

HOUNSLOW	MONDAY 26 SEPTEMBER	12 noon – 9 p.m. Littlewoods store Hounslow Centre, High Street.
CROYDON	TUESDAY 27 SEPTEMBER	12 noon – 9 p.m. Littlewoods store, 5–9 North End.
WEMBLEY	WEDNESDAY 28 SEPTEMBER	12 noon – 9 p.m. London Esso Motel, Empire Way.
CENTRAL LONDON	THURSDAY 29 SEPTEMBER	12 noon – 9 p.m. White House Hotel Albany Street, N.W.1.
HENDON	FRIDAY 30 SEPTEMBER	12 noon – 9 p.m. Handon Hall Hotel, Ashley Lane, N.W.4.

North

EDINBURGH	MONDAY 26 SEPTEMBER	12 noon – 9 p.m. Littlewoods store, 90–91 Princes Street.
NEWCASTLE	TUESDAY 27 SEPTEMBER	12 noon – 9 p.m. Littlewoods store, 42 Northumberland St
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LEEDS	THURSDAY 29 SEPTEMBER	12 noon – 9 p.m. Littlewoods store, Briggate/Kirkgate.
MANCHESTER	FRIDAY 30 SEPTEMBER	12 noon – 9 p.m. Midland Hotel, Peter Street
LIVERPOOL	MON–FRI 26–30 SEPTEMBER	12 noon – 9 p.m. Littlewoods Management Services Training Centre, 2nd Floor, Spinney House, Church Street.

Midlands

NOTTINGHAM	MONDAY 26 SEPTEMBER	12 noon – 9 p.m. Littlewoods store, 6–12 Long Row, Off Old Market Square.
LEICESTER	TUESDAY 27 SEPTEMBER	12 noon – 9 p.m. Littlewoods store, 6 Humberstone Gate.
COVENTRY	WEDNESDAY 28 SEPTEMBER	12 noon – 9 p.m. Hotel Leofric, Broadgate.
BIRMINGHAM	THURSDAY 29 SEPTEMBER	12 noon – 9 p.m. Littlewoods store, 67–69 High Street.
WOLVERHAMPTON	FRIDAY 30 SEPTEMBER	12 noon – 9 p.m. Littlewoods store, 4 Wulfrun Square.

If you can't make it on any of these dates, write with brief details of your age, education and experience to date to :– Linda Reavey, Management Appointments Department, Littlewoods, JM Centre, Old Hall Street, Liverpool X, OR telephone 051-236 8516 (24-hour Ansafone) for an application form.

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£8,000+ SALESPEOPLE Midlands

Our client requires experienced people, either with a sales or engineering background, to sell mini computer interface and peripheral equipment. Basic salary to £5,000 plus commission plus car.

£3,000+ Several areas

A manufacturer of a wide range of computers and peripherals requires graduates or others with proven sales experience, aged between 25 and 30 years.

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To £5K SENIOR PROGRAMMER Huntingdon

This requirement is for a senior person with really good experience of IBM COBOL usage under OS/VS.

£neg ASSEMBLER PROGRAMMER Berks

We are looking for assembler level programmers for a software and systems house. Our client would consider retraining COBOL programmers to work with mini and micro systems.

We have a number of clients in different areas seeking experienced assembler programmers.

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To £8,000 SYSTEMS ANALYST Enfield

The successful applicant for this job should have had at least three years systems experience and be familiar with several different mainframes. The person appointed will have the opportunity to play an important part in the development of new systems and application of new techniques.

To £5,500 PROGRAMMERS Enfield

The same client is also looking for programmers with experience of any or all of ICL COBOL, PLAN, IBM COBOL and BAL. Experience of eighteen months and upwards considered.

COMPUTECH 01-794 0202

To £7,000 PROJECT LEADER London, EC

Our client is an international bank and requires an able Systems Analyst with a COBOL programming background. This is an IBM installation but DEC experience will be an asset.

£4,500-£6,500 SYSTEMS ANALYST Hants

Major oil company - IBM 370.

£3,500-£5,000+ Hants/Dorset ANALYST PROGRAMMER

RPG 2 preferred, COBOL, PL/1 considered.

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PROJECT LEADERS: TO £6000

Our Sister Company, QRH Software Ltd., are seeking a number of Applications specialists who have the ability and motivation to make a significant contribution to the Company growth. The persons appointed will not only be technically competent but will be able to function in an advisory capacity in a Pre-Sales Environment.

The standards that we set are extremely high, as befits a Professional Company, but so are the rewards.

We require people with extensive applications experience in the general commercial area's especially Manufacturing Systems, Order Processing, Stock Control and General Accounting. Probably just as important as technical expertise is the kind of personality that can get the best possible results from the Project Teams they will control.

With a current growth rate of 200% we are looking for people with the ability to grow with the job and the Company, so if you are stretched in your current position, you will not make it with us.

If you have good applications experience with Man Management thrown in and experience of Mini Computers, typically Burroughs B700/B80/B1700, Dec. Systime, Singer 10, 2903, System 32/34, NCR Century 75/100, and believe that hard work will only bring progression, not old age, then it's about time we got together.

Write, telephone or call in to
C. R. Courtney-Stones—Executive Director
QRH COMPUTER RECRUITMENT
Queens Road Mills, Halifax HX1 4LR
Tel. Hx. (0422) 58232

LOLA

now has vacancies for the following staff to work on one of the largest and most advanced local government computer installations. Current equipment is a 2-megabyte IBM 370/158. On-line teleprocessing/database systems have been developed and are continuing to be expanded.

Programmers
£4161-£5346 incl.

Minimum 2 years' programming experience with at least 1 year's PL/1. Experience of working in a teleprocessing database environment would be an added advantage.

Junior Programmers
£2860-£4073 incl.

Minimum 6 months' programming experience and 'A' level qualifications. Training in PL/1 given if necessary.

Operators
From £4200 incl.

Experience of OS/VS1 (or comparable operating system). Applicants should have been educated to "A" level standard and preference will be given to those with at least 4 "O" levels including Maths. Availability for 3-shift working essential.

Further details and application form from:
Mrs B Dorrington
LOLA
Tower Point North
Sydney Road
Enfield, Middx. EN2 6UE
Tel: 01-366 6811 (ext. 276)
(Closing date for returned applications 10.10.77)

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occ computer personnel limited

18 Bedford Row, London WC1R 4EB. 01-242 9356. Telex: 21202

Specialists since 1971 in UK and International computer appointments

● Surrey

RPG Consultant Programmer

£5,000 - £7,000

Our client is a Software House operating in the U.K. and oversees. Opportunities for permanent employment, based in London or Reading, can offer a variety of locations as well as a wide selection of projects on different types of hardware such as ICL 2903/4 and ICL 2960/70.

There is a vacancy for a Senior Programmer with a sound knowledge of RPG. The first assignment will be an 8 months', project in Surrey on a 2903 installation. The project will deal with commercial account systems and the programming language will be RPG II. A knowledge of 2903 RPG II would be an obvious advantage.

Alternatively, the vacancy could be filled by a more senior candidate who could offer, in addition to the above requirements, other valuable experience and could take Project Management responsibilities on future projects. A background in Software, Design and/or Operating Systems support. Real Time Systems implementation on mainframes or minis would be very attractive.

PROJECT LEADERS with ICL SYSTEM TEN (SINGER 10) experience are also invited to apply. Salaries in excess of the maximum quoted are negotiable for candidates with exceptionally good experience.
Ref.: 571/CW/Renée Nute

● London

Systems Consultants

£6,000 - £8,000

Computer Systems Audit, Training and Systems Consultancy for major firm of Chartered Accountants

A major firm of Chartered Accountants offers a specialised service to deal with the problems of auditing and financial control arising from the use of computer based systems. A number of the firm's young CAs are trained each year in systems analysis and computer techniques and then work on the study, assessment, etc., of individual cases. These CA/systems analysts are trained and advised on their assignments by experienced computer systems analysts. A further two such people are now required. The work involves specific consultancy assignments, as well as training.

Candidates must have varied computer experience (7-10 years) including programming; all aspects of systems analysis, design and implementation; experience of on-line systems and telecommunications; a knowledge of hardware and software; a knowledge of related disciplines such as OR, economics and so on. Candidates need an excellent command of English and must be systems minded. A job specification is available to suitable candidates.
Ref. 717/CW/Neville John

● Middle East

Univac based systems, major development projects

Requirements in the Middle East generate an urgent need for the following personnel.

Data Base Designer

c$30,000 tax free

Main responsibility will be in the area of logical data base design and implementation, including technical advice and guidance in this area. Previous experience must include Data Base design, ideally using Univac DMS although similar experience on other hardware could be of interest.

Operating Systems Specialists

c$30,000 tax free

Responsibilities will include both consultancy and direct involvement in the generation and enhancement of the Exec 8 operating system and related software. Candidates must be technically competent and thoroughly familiar with this software. Positions will be offered on a renewable contract basis with initial periods of at least 12 months. Single candidates, or those married with no schooling commitments, are preferred.
Ref.: 351UM/CW/Roger Allington

● Far East Contracts

c £700 pm (tax free) + accom.

Our client provides DP Consultancy and Education Services in the Far East and Australia. They currently have urgent requirements for contract staff in the following areas:

Training — IBM Systems Appreciation and Design

The job will involve the compilation and running of short courses for technical personnel in the design and implementation of IBM based systems, from an application viewpoint. Candidates should therefore have a broad IBM background covering systems analysis and preferably both applications and systems programming, e.g. OS, VSAM, CICS, IMS, COBOL, Assembler, together with an interest in training. Initial contract 6 months, starting mid-October.

Training — PL1

An experienced PL1 programmer is required in Singapore to provide PL1 training to foreign nationals. Initial contract 3 months, starting end of October.
Ref. 446B/CW/Sharon Matthews

DL1/COBOL Programmers

Two programmers are urgently required to work on an IMS project in Brunei. Candidates should have good DL1 and COBOL experience, and preferably a knowledge of Mark IV. Initial 6 month contracts, to start a.s.a.p.
Ref. 446C/CW/Sharon Matthews

To apply for any of the above positions or for further information, please telephone or write to the Consultant concerned on 01-242 9356. If it would be more convenient to telephone in the evening, the telephone numbers are:
Neville John — Fernborough (Kent) (66) 52017. Roger Allington — Berkhamsted (04427) 2299. Renée Nute, 01-874 6372. Sharon Matthews, Billericay (02774) 22351.

Members of Computing Services Association

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Cable and Wireless, a leader in global telecommunications, require Computer Systems Test Engineers to work in their Southwark offices.

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You will commission/system test message switching systems, using P.D.P.8 mini-computers and multiplex equipment manufactured in-house. A thorough knowledge of P.D.P.8, mini-computer technology is a prime requirement.

Your Experience

At least two years mini-computer experience, some system design experience, and ideally some software programming experience.

Your Qualifications

An H.N.C. in electronics or equivalent.

Salary

Would be commensurate with age and experience, plus the benefits usually associated with a worldwide organisation.

For an application form, please contact:

Miss C. Morgan
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114 Great Suffolk Street,
London SE1 0SG
Tel: 01-928 1901 Ext. 236

Cable & Wireless

Programmers to £5,000

ESSEX

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CW38/5 Annette.

Programmers £5,000

ENFIELD/BIRMINGHAM

Five COBOL programmers, preferably with large machine experience, are urgently required by this medium sized with-it service bureaux having H66 equipment for both their Enfield and Birmingham offices. Flexitime, subsidised canteen and 4 weeks hols.
CW38/9 Annette.

Programmer £5,500

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Would you like to increase your knowledge or learn about DL/1 and CICS? Then all you need is good PL/1 programming experience to join this progressive manufacturing organisation. Benefits include 4 weeks hols, NCPS, free life assurance and a very active sports and social club.
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Senior Programmer to £5,500

CITY

A profitable Service Bureau of long standing has need of a D.E.C. programmer with on-line and PDP RSTS experience using BASIC. Here is an opportunity to grow with a growing firm.
CW38/11 Michael.

Programmer £5,000 to £6,500

W. LONDON

A famous International Petro-Chemical organisation using a Univac 1108 requires commercial programmer with COBOL EXEC 8 experience. Excellent large company perks, long hols. and very good promotional prospects.
CW38/12 Annette.

Senior Systems Analyst Application Programmers £4,000-£6,000 +

NEAR HERTFORD

A large commercial company with big computer plans is about to design a new complex integrated transaction system. They require COBOL oriented people with financial or production control experience. Perks include discount on goods and subsidised canteen.
CW38/13 Annette.

Systems Analyst and Analyst Programmers £5,000-£7,500

S.W. LONDON

An international insurance company with major expansion projects under way is looking for staff at all levels. The senior applicants must have insurance experience and the programming staff must know IBM COBOL DOS/VS. Free life assurance, 3 weeks' holidays, etc. A really exciting opportunity for the right people.
CW38/14 Annette.

Systems Analyst to £6,500

S.W. LONDON

A major food group situated in S.W. London is engaged on a new expansion of its computer systems department. Commercial analysts (preferably with on-line experience) are requested to apply for this really exciting position. Excellent prospects
CW38/15 Annette.

Senior Systems Analyst c £6,500

NR. STAINES

If you have ICL financial and commercial systems experience and like to be in charge, then this position could be for you. The firm is part of a large manufacturing group with a secure future.
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01-492 1841

COBOL PROGRAMMERS

£180-£250 per week
Short or long term

01-402 9355

Operations Supervisor

COMPUTER BRANCH

LEEDS

Applications are invited from men and women for the above position, based at Becca Hall, Aberford, which is ten miles east of Leeds.

The computer installation comprises an ICL 1903T–192K store, operating under GEORGE 3 system with EDS 60: 180 KCS MTUs, plus an ICL 7905 acting as an interface with the IBM 370 configuration at the Board's Headquarters in London.

The Operations Supervisor will be responsible to the Operations Controller for the co-ordination and management of the Operations and Job Assembly Sections, the provision of an efficient processing service for all user departments and the operation of a developing terminal network.

Applicants should have had experience in Computer Operations in a senior capacity and be capable of assessing staff.

Experience of an operating system, preferably GEORGE 3, Terminal Networks, and the ability to plan and schedule a large machine with a tight timetable, would be a distinct advantage.

The person appointed will have to provide his/her own transport.

The salary will be within a range of £4,007 to £6,320 per annum.

Point of entry will depend upon experience and qualifications.

Applications in writing, giving details of age, experience, qualifications, present position and salary, should be forwarded to the Regional Personnel Manager, Central Electricity Generating Board, North Eastern Region, P.O. Box 177, Merrion Centre, Leeds LS1 1RL to arrive not later than Monday 3 October 1977, quoting reference SVN 571/CW.

North Eastern Region

SYSTEMS ANALYST

c. £5,000

Commercial organisation with ICL 1901T, EDS 60's and VDU's is shortly embarking on an exciting development phase and seeks applicants for the above post.

You will have a fair amount of commercial systems experience together with a Cobol programming background. The position also entails deputising for the DPM in his absence.

Application forms will not be used so please communicate concise relevant details to: **C. G. Lester, Finsley & Co. Ltd., Collingwood House, Mercers Road, London N19 4PL. 01-272 2061.**

ANGLIAN D.P. SERVICES LTD

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Programmer (RPGII)	**Suffolk - £Neg.**
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Programmer (ICL COBOL)	**Norfolk - £3,500**
Analyst Programmer (IBM)	**Suffolk - £Neg.**
Sen. Programmer (IBM 360)	**Essex - £5,000**

Phone: Danbury 4255 (STD 024541) or write ANGLIAN D.P. SERVICES LTD, Stretford House, Maldon Road, Danbury, Chelmsford CM3 4QW.

Data Processing Manager

Nigeria **c. £17,000**

For the Lagos headquarters of a major trading company which has an annual turnover in the region of £100 million.

Reporting to the financial director, the successful applicant will be required to set up a new installation (ICL 2903) from scratch.

Candidates, ideally with a degree or professional qualification, must have previous experience of programming and systems analysis leading to computer management.

In addition to the basic salary, generous fringe benefits include free housing, six weeks' home leave including air passages, education allowances and provident fund.

Write in confidence quoting reference 2453/CW to M. J. H. Coney,

Peat, Marwick, Mitchell & Co.
Management Consultants,
11 Ironmonger Lane,
London, EC2V 8AX.

CERN — European Organization for Nuclear Research — Organisation Européenne pour la Recherche Nucléaire

CERN, a European Research Laboratory situated near Geneva, has vacancies for

COMPUTER CONSOLE OPERATORS

in its central computer service. This is at present based upon CDC 7600, 6600, 6400 computers and an IBM 370/168 system.

The posts involve shift work including weekends and public holidays.

Candidates should have successfully completed their education to at least 'GCE "A" level or equivalent preferably including computer science or other scientific subjects. At least two years experience of computer operation including some IBM experience is desirable. A knowledge of French would be useful.

For application forms, please write to:
Head of Personnel, CERN, 1211 Geneva 23, Switzerland
Quoting the reference: DD/CO-77/1

THE UNIVERSITY OF LIVERPOOL

Computer Officer

Applications are invited for the post of Computer Officer in the Computer Laboratory. A good honours degree is essential and preferably a post-graduate qualification. Experience in the following is of special interest: data base management; microprocessors; computer networks; interactive graphics.

Initial salary will be within the range £2,904-£3,761 per annum on a scale rising to £5,827 per annum.

Applications, together with the names of three referees, should be received not later than 14th October, 1977, by the Registrar, The University, P.O. Box 147, Liverpool, L69 3BX, from whom further particulars may be obtained. Quote Ref: RV/653/CW.

GREATER GLASGOW HEALTH BOARD
COMPUTER CENTRE

Computer Programmer

Grade 1

Salary Scale. £3183-£4038 (inclusive of Phases I and II)

Applications are invited from Programmers with a minimum of one year's practical experience programming in Cobol. A background in any of the following would be an advantage:

1) Financial or Administrative Applications
2) Knowledge of ICL equipment
3) Knowledge of Filetab or FTL8

Application form and further details may be obtained from the Personnel Officer, Greater Glasgow Health Board, 351 Sauchiehall Street, Glasgow G2 3HT, to whom completed forms should be returned no later than Monday, 3 October, 1977.

Programmers and Programmer/Analysts
—there's a world of difference at ISL

A lot of the difference is centred around our international role. IBM Information Services Limited helps IBM's business run smoothly in over 20 countries, backed by a large System/370 installation, and a complex international information network linking over 2,000 user terminals.

As one of our Programmers or Programmer/Analysts you'd be at the heart of this operation—in contact with overseas IBM locations, helping design, develop, install and maintain international applications systems and on occasions travelling abroad to meet and help your colleagues on the spot.

It's an important job, presenting a considerable challenge to your initiative and creative programming abilities.

And it offers plenty of room for progress. As your career develops, you'll be able to move around within the company, broadening your experience, strengthening your expertise.

Here's what we're looking for: young programmers and analysts, male and female, with a minimum of a years' experience in a commercial DP environment. A high-level language, such as PL/1, plus experience of OS, IMS or tele-processing would be ideal, but isn't essential.

We also offer first class training for aspiring DP professionals and we'd be particularly interested in hearing from recent graduates.

We offer generous relocation expenses to our new headquarters in this attractive part of the South Coast, which has out-standing recreational and social facilities.

Salaries are very competitive and IBM's employee benefits package is acknowledged to be one of the best in industry today. Interested? Then write now with full details about yourself to John Mann, Personnel Officer, IBM Information Services Limited, PO Box 39, North Harbour, Portsmouth PO6 3AA quoting ref: CW/93244

IBM
Information Services Limited

HERTS AND NORTH LONDON

We specialise in D.P. recruitment for clients in Herts and North London and the following vacancies are taken from our current register:

ENFIELD (i)
An experienced Systems Analyst with an IBM System 3 or ICL 2903 background is required by small but professional installation currently engaged in company accounting projects (Circa £8,000).

ENFIELD (ii)
The Management Services Group of a large and complex ICL user has vacancies for Systems Analysts (up to £8,000), Senior Programmers (up to £5,500) and Programmers (up to £4,600) to assist in the development of a range of T.P. and batch applications. Hardware will shortly include an ICL 2970 planning for which is well under way.

ENFIELD (iii)
A growing company located in modern offices requires an experienced Cobol Programmer (2 years, any machine) for their ICL 2903. A salary of £4,500+ is offered plus an opportunity to move into systems analysis at an early stage if desired.

BARNET
Situated just north of Barnet, small, friendly IBM 370/125 installation has a vacancy for a Programmer/Analyst or Programmer with at least 2 years' IBM Cobol experience. (£4,500+).

FINCHLEY
Electrical instrument manufacturer is seeking a Senior Systems Analyst (up to £5,945) to play a leading role in the development of four major real-time systems for their new ICL 2980. Applicants need have no previous real-time experience.

WALTHAM CROSS
One of the leading rental groups in U K known for its progressive management offers a dynamic but structured career in its ICL 1904S/VDU based computer division. Applications are invited from Analysts (up to £5,200), Analyst/Programmers and Cobol Programmers, not necessarily ICL (up to £4,882).

For more information on these and many other vacancies ring

HAYMARKET COMPUTING LIMITED. Tel. CUFFLEY (HERTS) 4130
(UP TO 7.00 p.m.)

PDP11 Programmers

we're talking your language in Manchester

Your PDP11 programming experience and our advanced software developments in Computer Aided Design—put them together and you've got a career opening that spells job interest, and really challenging work in a stimulating environment. At Ferranti Semiconductors in Manchester we are strengthening our C.A.D. facilities and need programmers, ideally with a degree and some useful experience either in PDP11 machine code programming or scientific programming.

Salaries are negotiable and there's the 'big company' benefits and sensible house prices of the Manchester area to attract you—start right now and send brief details of your qualifications and experience, in the first instance, to: T. J. Lunt, Staff Manager, Ferranti Limited, Hollinwood, Lancs. OL9 7JS quoting reference FRR/2/CW

FERRANTI

Edmund Howard's Client Album

PROGRAMMERS
RANGE UP TO £5,000
ON-LINE SYSTEMS
DATABASE DEVELOPMENT
WEST LONDON

Further development within our client's data processing centre has created two openings for self motivated Cobol programmers to assist with the development of new ON LINE systems and DATA BASE developments. Although systems are disk based on Univac hardware, experience gained on IBM or other leading hardware will be given serious consideration.

Our client is a well known international organisation mainly concerned with the production and marketing of industrial and agricultural equipment. The two appointments advertised are a realistic opportunity to develop and broaden one's current achievements within a friendly and forward thinking company. For further details please quote CW152

ICL OPERATORS G2 and G2+
HOME COUNTIES (WEST)
£3,900 rising to £4,300 after one year

Here is an opportunity to join a leading international organisation, whose products are brand leaders in the power tool market.
Currently they require additional operations personnel with at least 18 months' experience of G2 or G2+. Systems are based on an ICL 1903 T running under G2+ with on-line facilities.
The D.P. Centre is spacious and well planned, with an excellent working atmosphere. The company operates a policy of internal promotion. Other benefits include four weeks' annual holiday, a subsidised restaurant and generous discount on company products.
For further details please quote CW153.

REAL-TIME PROGRAMMERS & ANALYST PROGRAMMERS
UK AND HOLLAND

Some of the most interesting developments in Data Processing today are taking place within the Avionics/Aerospace industry. This development has created a large number of openings for high calibre personnel with scientific or avionics expertise. Ideally, candidates should hold a degree or equivalent and have experience of real-time systems with Assembler and/or Fortran. These are attractive positions offering plenty of variety to individuals wishing to progress in a challenging and rewarding environment.
For further details please quote CW154.

SENIOR PROGRAMMER
SALARY c. £6,000 p.a.
LONDON, SW1

A highly specialised consultancy is currently seeking an experienced senior programmer to assume total responsibility for the company's commercial programming activities.
The successful candidate should possess a sound knowledge of Cobol coupled with in-depth experience of the IBM DOS Operating System. An ability to deal with personnel at all levels is essential. Additional duties will include providing technical support to the operations team to ensure that objectives are met within the timescales laid down.
This is a key position for someone with the right qualities whose background combines both skill and professionalism, in keeping with the company's fine reputation for providing a good and efficient service. For further details please quote CW155

Edmund Howard & Partners
Computer Personnel Consultants
5 Brighton Road, Surbiton, Surrey. Telephone 01-399 9183.
38 Grafton Street, Dublin. Telephone 775 756.

Operations Manager — Bermuda

London Interviews Next Week

SDI, the creators of GRASP (VS), EPAT and FLEET have a vacancy for an OPERATIONS MANAGER at their research centre in HAMILTON, BERMUDA, where an IBM 370/135 is installed.

The requirement qualifications are:

- ★ Prior experience as Operations Manager of a DOS or DOS/VS installation.
- ★ Prior experience with at least our GRASP or GRASPVS product.
- ★ Ability to control a disciplined, security oriented, computer room environment.
- ★ Previous systems programming or operational support experience so to be able to control our installation's software systems generation and maintenance. .

Bermuda is a conservative British Colony in the Mid-Atlantic. Less than two hours from New York. It has a pleasant climate and stable government. Salaries are paid in US Dollars and there is no income tax. SDI will assist in obtaining work.

Permits for successful applicants. A relocation allowance will be paid.

Applications from Bermudians especially welcome.

To apply for this position or obtain further information please telephone Brenda Anderson. 01-736 1382.

SDI

Chief Programmer

£6000

This is an opportunity for a professional in a major manufacturing company with a large capital investment programme which depends on effective data processing. Initially using terminal links to the Group Headquarters' 370/158 computers operating on OS/VS, the Chief Programmer, reporting to the Management Services Manager, will build on existing IMS Data Base programs which will provide crucial management information. A major original contribution is necessary in the establishment of the highest possible standards and the building of a team. Considerable independence of action will be given to the person appointed.

Big company Cobol experience is essential. The requirement is for a high standard of professional competence and growth potential. Knowledge of DLI or Assembler is desirable; though full off-the-job training will be given.

Please write with full details. These will be forwarded direct to our client. List separately any companies to whom your application should not be sent. Ref. FY.1633.

This appointment is open to men and women.

ASL CONFIDENTIAL RECRUITMENT 17 STRATTON STREET LONDON W1X 6DB
A member of MSL Group International

LONDON
CUSTOMER ADVISOR

(pre & post sales support) (timesharing)

Income c £6,000 including performance related bonus plus car or car allowance

This position is within the Government/public sector sales region of a major computer services company engaged in on-line computer services. The company's products, facilities and resources have secured its position as a market leader. To complement its existing Government sales and support group, it now requires a person with the following skills and attitudes:-

- ★ sound technical experience, ideally of on-line systems
- ★ FORTRAN programming skills and a degree in a numerate discipline
- ★ the ability to communicate effectively with clients and to respond to a sales orientated working environment
- ★ interest in working in an environment where reward is related to performance.
- ★ should have an investigative mind

This is an ideal opportunity for someone coming from a technical background to move into a commercially biased sales role in the fastest developing sector of the services industry.

CONTACT DAVID SCARLETT
ADVISING CONSULTANT ON: 01-935 0671 REF. NO. 77/09/19

DATABASE & T/P in SURREY

JUNIOR ANALYSTS to £5,750
ANALYST flextime

Our clients innovative team, based in an attractive tailored D.P. Complex have already gained considerable expertise in the use of Database techniques and on-line facilities.
They are now entering a major development phase in order to provide a more sophisticated group service in the production, finance and distribution areas.
This opens the door to increased **Real Time** and probably **Distributed Processing** projects and represents a considerable challenge to the following appointees:-

2 JUNIOR ANALYSTS Ideally young IBM programmers with appreciation of systems design.

OR

Young O & M Analysts You would already possess two years commercial experience, together with the potential to rise to a more creative user-liaison role.

SYSTEMS ANALYST

This is an opportunity to contribute to an exciting era of the groups growth which will reflect in your expertise gained in state-of-the-art projects.

Contact: LONDON OFFICE on: 01-935 0671 REF. 77/09/20

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Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 3BD
LONDON 01-935 0671 FREEPOST
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Computing Services Association

TPS

ONLINE SYSTEMS: £3-5½K

PROGRAMMERS
(Minimum 1 year ICL)

SENIOR PROGRAMMERS

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Our continuing success and outstanding growth means we need more people to work on client projects in London and other U.K. and international locations but particularly at our Oxford offices.

IF YOU HAVE ONLINE SYSTEMS EXPERIENCE OR WISH TO ACQUIRE IT WRITE OR PHONE:

TELECOMPUTING, SEACOURT TOWER, WEST WAY, BOTLEY, OXFORD (0865) 723621

EUROPE'S LEADING SPECIALIST RECRUITMENT CONSULTANTS

TECHNICAL MANAGER for the MIDDLE EAST to £15,000 p.a.

Modern Society with Western amenities

+ NEW FURNISHED FLAT (Married or Single)
+ TERMINAL BONUS (2 to 3 year contract)

THE COMPANY is a major distributor for one of the premier minicomputer manufacturers who already have a sound user base in the area and whose business continues to expand at a high rate.

RESPONSIBILITIES are for all applications development and technical support with regard to the computer systems distributed and supported by the company. The Manager will control a team of around eleven software and hardware specialists, all the work being applications orientated. In addition, he will personally become very much involved in the technical work.

REQUIRED PROFILE is as follows:
1. Real Time experience is essential.
2. Must have controlled a technical team.
3. Knowledge of commercial applications.
4. Able to play a technical as well as managerial role, ideally having knowledge of COBOL and FORTRAN, and having worked with minis.
5. The ability to adapt to an unfamiliar environment.
6. Age likely to be in the range 25 to 40.

TRAINING of considerable duration will be provided.

THE ABOVE POSITION OFFERS AN EXCELLENT OPPORTUNITY TO ACCUMULATE CAPITAL IN A POSITION OF RESPONSIBILITY.

Please reply without delay, quoting ref. CW 914.

DPSC
Crown House Morden London SM4 5EU
consultancy division
01-540 8311
24 hour answering service

What if we said you wouldn't have to make this journey any more?

Informal interviews: Great Eastern Hotel, Liverpool Street, 9am–9pm, 27th September, 1977.

Are you fed up with the expense and discomfort of coming into town every day? Then we have some attractive computer jobs at the North East Thames Regional Computer Centre near Harold Wood Station. From there, the Centre provides a range of computer services aimed at increasing the efficiency of health care throughout Essex and North and East London.

If you are experienced in systems analysis or programming at junior, senior or management level, calling in at the Great Eastern Hotel (Abercorn Rooms, entrance in Bishopsgate) could be your first step to a better job. You can chat to our representative in a relaxed atmosphere and see slides and publicity material relating to the Centre's role which covers a wide spectrum of computing activities using a large 1900 mainframe, various mini, and micro computers.

If you are unable to see us on Tuesday, either call us at the hotel on 01-283 4363 Ext: 309 or write or phone for job descriptions and application forms to the Regional Personnel Officer, North East Thames Regional Health Authority, 40, Eastbourne Terrace, London W2 3QR. Tel: 01-262 8011 Ext: 143.

Are you interested in a career in automation? Contact:
HOLLAND SYSTEM HOUSE
Rijkastraatweg 19, De Meern, Holland

Currently we are looking for experienced
COBOL PROGRAMMERS/ ANALYSTS
Fortran experience will be an advantage.
Enclose a detailed c.v.

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Get a free winter holiday
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OS COBOL
North England
Permanent or Contract
Ring Derek Astley
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"I'm analysing the tea-lady's performance next"

Compete with such projects? Us? You must be joking.

That's why we're after men and women who've had their fill of the 'big-time' and want to get back to more run-of-the-mill stuff . . . like developing new flexible systems to meet our continually changing sales, finance, production and distribution needs.

So, if you can put up with the drag of being involved in a variety of major projects . . .

. . . the incredible bore of working in a highly creative environment – soon to feature an IBM 148 worse luck . . .

. . . and, if you can bear the stigma of joining one of the country's largest specialist engineering Groups which has foolishly almost doubled in size over the past three years' and which the pundits say has enormous growth potential . . .

. . . then the sooner you get stuck into the control implementation, documentation and maintenance of cost effective systems for us is the better we'd like it.

Systems Analyst-Finance Development

To join a head office Project Team working on Group financial systems. Educated to 'A' level with recognised training, you must have at least a year's experience in systems analysis.

Systems Analyst-Production Control

Educated to 'A' level and formally trained, proven experience of production control in an engineering environment would be an asset. You'll be based at a construction equipment company in Gainsborough which is currently remodernising its production plan.

Still with us?

Then certainly salaries, benefit and incentive training scheme will encourage you to stay.

And the chance to live in an attractive area also offers excellent facilities plus cheap housing.

If you know a good thing when you see it, Contact Peter Smith, Leyland Special Products Group, Sysonby Lodge, Nottingham Road, Melton Mowbray, Leicester LE13 0PA. Tel: Melton Mowbray (0664) [illegible]

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MANCHESTER

TELEPROCESSING AND DATA BASE DEVELOPMENT OPPORTUNITIES

Our client is a major manufacturing company supplying the motor industry. It is now entering an exciting phase of new development in the production, stock and distribution areas, and this has led to the following vacancies:

PROJECT LEADER c. £5,500

Applicants for this position should have 2 or 3 years' experience implementing significant systems in the relevant fields. Experience of data base and teleprocessing is essential as is a knowledge of programming. Education should have preferably been to degree level.

PROGRAMMER/ ANALYST TO £4,000

Programmers with a minimum of 2 years' COBOL experience and 'A' level education who wish to progress into Systems Analysis are ideal for this position.
Experience with Database or teleprocessing would also be advantageous.

PROGRAMMER TO £3,500

A minimum of 1½ years' experience of COBOL, 'A' level education and the desire to join a professional department where career progression comes quickly are required for this position.

Our clients' premises are located near the City Centre with ample free parking. The company offers excellent conditions of employment including assistance with relocation expenses where applicable.

CONTACT TONY DEANE on: 061-833 0676
ADVISING CONSULTANT

REF. NO. 77/09/21

SPECIALIST COMPUTER RECRUITMENT LTD.
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SCR

Computing Services Association

CONTRACT & PERMANENT SYSTEMS PROGRAMMERS

SALARY: circa £8,000 or £180 p.w.

A major U.S. mini-computer manufacturer urgently seeks to advance their compiler development program by enlargement of its project team. The essential requirement is a solid background in assembler ideally combined with compiler or simulator software development.

Several grades of applicants are required — Senior Project leaders having not less than 5 years assembler preferably in an IBM main-frame environment; Senior programmers will have not less than 4 years assembler and Programmers in excess of 2 years.

In addition to exceptional salaries our clients offer numerous other benefits including overseas travel and non-contributory pension scheme.

Interviews will be held the week following this advertisement through the middle of October and offers will be made to successful candidates within 1 week of interview.

Ref: 38/1

REAL-TIME MINI COMMUNICATIONS GATWICK/HOLLAND

U.K.: circa £7,500 HOLLAND: £12,000+

A major International Software House requires Senior Analysts, Analyst/Programmers and Applications Programmers who will be initially based near Gatwick and thereafter be transferred to Holland.

Applicants with Real-Time and hopefully communications experience are ideally required. Additionally persons with a background in marketing-support would be useful in another important area.

These positions will appeal to persons who value job interest and career development at least as highly as monetary benefits. Only applicants prepared to view their next move as long-term will be considered ideal for these very important appointments.

Real and tangible fringe benefits add to the considerable attraction of this company and interested applicants should phone as soon as possible to arrange an interview in London for late September or early October.

Ref: 38/2

informatix

MINI PROGRAMMERS, ANALYSTS AND CONSULTANTS N. EUROPE

THE COMPANY:
Is a large international consultancy and systems implementation group. In keeping with its prestigious reputation it urgently requires top calibre personnel to implement its rapid expansion programme and has retained Informatix to assist with their personnel requirements.

TECHNICAL REQUIREMENTS:

A. Analyst/Programmers having not less than 2 years' experience of Assembler programming relating to Mini Computer applications.

B. Senior Analyst/Programmers having not less than 4 years experience of design and implementation of mini computer systems for on-line and/or real-time applications involving assembler level programming in a mini computer environment.

C. Consultants will have not less than 6 years of mini related experience preferable with exposure to either communications, networks or sophisticated T.P.

CONSULTANTS UP TO £15,000
ANALYSTS/PROGRAMMERS £10,000.
Dependent on qualifications and experience
8% HOLIDAY BONUS

PREREQUISITES:
Ideally candidates should have a professional qualification or a degree equivalent preferably related to computer science. Mathematics, science or related areas. Significant relevant experience may be acceptable in lieu of the aforementioned requirements.

THE PROSPECTS:
In addition to excellent salaries candidates will meet with technically rewarding projects and rapid advancement career prospects are open to those whose contribution enhance the professional reputation and expertise of this group — a world leader in 'State-of-the-Art' systems implementation

THE REMUNERATION:
Relocation allowances will be reimbursed to candidates and their families Four weeks' paid annual holiday plus 8% holiday bonus is payable in addition to salaries adjusted upwards to meet cost-of-living differentials. Temporary accommodation will be provided at the outset pending location of permanent accommodation.

INTERVIEWS:
To be held in London during September and early October. It is anticipated that employment offers will be made to successful candidates within 10 days of interview.

Ref: 38/3

Telephone: 01-409 0468

informatix

Avon House, 360-366 Oxford Street, London W1N 9HA.
(Opposite Bond Street underground)
Telex: 28800

IMPC IRISH OPPORTUNITIES

SYSTEMS SUPPORT MANAGER — IRELAND

DUBLIN — Salary Negotiable + CAR + BONUS

This is a senior appointment reporting to the General Manager of an established multinational computer supplier.

We want applications from people who can identify with, and contribute to, the Company's marketing objectives and with.

— a strong programmer/analyst background
— demonstrate experience in project management
— ability to negotiate with Software Companies
— ideally a knowledge of small I.B.M. systems

As part of the management team you will:

— lead and develop the Systems Support Groups in pre- and post-sales activities.
— assist in the development and implementation of sales and marketing strategies.

IMPC (Ireland) Limited
33 Mespil Road
Dublin 4
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Telephone: 681277

THE REWARDS
— A high basic salary with attractive Incentive Bonus — Company car — First-class fringe benefits and high grade technical and management training.

Write or telephone now to Pat Rafter, Managing Director, quoting reference CW004.

SALES EXECUTIVE — IRELAND

DUBLIN **POTENTIAL — £11,000+**

International computer manufacturer, with a large installed base of small sophisticated computers has immediate vacancies for experienced sales executives

If you
— have a proven sales record
— have a sound background in Disc based computers
— can conduct top level sales negotiations
— are highly motivated and seeking career development

A generous basic salary, and a highly rewarding commission plan will reward your success by making you one of the highest paid salesmen in the industry

Your first year's income will be guaranteed at a mutually agreeable level The rest will be up to you, with no limit

Then the challenge and high earnings potential of this opportunity will appeal to you

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Dublin 4
Ireland
Telephone: 681277

Write or telephone now to Pat Rafter, Managing Director, quoting reference CW005

SUPPORT SPECIALISTS — IRELAND

DUBLIN **£8.5K+**

A major multinational computer manufacturer currently involved in an aggressive marketing programme and an extensive installation schedule of mainframe computers, has urgent need for mature and talented support specialists, to join their highly motivated group based in Dublin

Successful applicants will have a strong programming/analyst background ideally with experience of programming in Cobol and RPG (System 3) Involvement in conversion projects and on line systems would be an advantage

Initial projects will involve working with and guiding user companies in the installation and implementation of new computer systems

Career progression is assured for the well motivated and imaginative support specialist through high grade training and opportunities for promotion based on performance and the ability to contribute to the growth of the company's business

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A high basic salary and first-class fringe benefits will ensure that you are one of the highest paid members of the industry relative to your contribution and experience

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IMPC (Ireland) Ltd. currently have assignments for the placement of a number of experienced personnel with Computer Manufacturers, Computer Bureaux and Computer Users.

If you have experience in, or feel you qualify for, any of the following appointments we should like to hear from you urgently.

Senior Sales/Marketing Management
Senior Sales Executive
Sales Executive
Systems Support Management
Project Management
Operations Management
Systems Analysts
Programmers

IMPC (Ireland) Limited
33 Mespil Road
Dublin 4
Ireland
Telephone: 681277

Your application will be treated in the *strictest* of confidence.

Write or telephone now to Pat Rafter, Managing Director, quoting reference CW001.

OPERATIONS SUPPORT

Centre-file is one of the leading Computer Bureaux in the country currently providing services to some 2,500 industrial and commercial organisations.

Due to expansion of our 'on-line' Batch and Custom Built services we require a number of additional staff to assist in the day-to-day running of our services which are run on our three IBM 370/155 machines.

We are looking for mature and responsible people, experienced shift leaders or operators would be ideally suited, with sound knowledge of IBM OS, JCL and utilities.

Salaries within the range of £3100-£5320 will depend on experience and in addition the Company offers an attractive range of fringe benefits.

Applications should be addressed to Mike Atkinson, Personnel Officer, Centre-file Limited, Boundary House, 18-22 Furnival Street, London EC4A 1JU.

A member of the National Westminster Bank Group

DP Training Consultant

to £8,000

BIS Applied Systems Limited, a leader in DP management consultancy in the UK and overseas, as well as a pioneer and supplier of a wide range of training courses, wishes to recruit additional staff into the expanding Training Division.
The job provides an opportunity to work in a highly skilled team of training staff and technical consultants. The Training Consultant's role will be to participate in the development and presentation of courses covering a wide variety of subjects including Programming Techniques, Systems Analysis and Design, Real Time, Data Base and Management topics.
The work offers scope for practical project exposure thus ensuring a long term career path within the training function or in the consulting divisions of the company.
There are also opportunities for occasional overseas travel.
Applicants are invited to write or telephone for further information to Derek Potts.

BIS Applied Systems Limited
79-80 Blackfriars Road London SE1 8HB
Telephone 01-928 9511

BIS Applied Systems

XOREN

BILTON HOUSE (East Wing)
54/58 Uxbridge Road
Ealing, London W5 2TL
Tel. 01-567 1123

We are a small software house specialising in computer systems and are currently looking for

REAL-TIME MINI SOFTWARE SPECIALISTS

£4,500-£7,000

Applicants should be able to demonstrate a good understanding of real time systems preferably with experience in such fields as communications, message switching and process control. They should also have a sound knowledge of at least one computer (experience on PDP 11s would be a particular advantage).

Computing Services Association

Please write to or telephone Mr. J. Jarvis giving details of experience

PROGRAMMER/ ANALYSTS

Brentford **c£4,500**

The Company wishes to recruit two analyst programmers to participate in the development of new systems on an ICL 2960 and a recently purchased mini computer.
Applications are invited from men and women with two or three years' experience preferably in an ICL 1900 environment using PLAN and George. Enthusiasm and a professional approach towards the job is essential If you feel you can satisfy these requirements we offer:

* A competitive salary.
* Excellent opportunities to learn new and exciting techniques.
* Comprehensive fringe benefits including free lunches

Please write or telephone in strict confidence to:
The Data Processing Manager
John Mowlem & Company Limited
Westgate House, Ealing Road, Brentford
Middlesex TW8 9QZ

Mowlem

THE UNIVERSITY OF ASTON IN BIRMINGHAM ADMINISTRATIVE DATA PROCESSING UNIT

ANALYST/ PROGRAMMER AND PROGRAMMER

Applications are invited from suitably experienced candidates for the above two posts. The Administrative Data Processing Unit, based on an I.C.L. 2903 installation, serves the administrative needs of the University, e.g. financial and management accounting, staff and student records. The Analyst/Programmer will report through the Systems Analyst to the Data Processing Manager. Applicants must have considerable programming experience in COBOL and be keen and keen record involvement in systems design. The Analyst/Programmer will be initially responsible for a sub-system of a financial accounts and reports system currently under development. Salary will be in accordance with the Other Related 16 scale — £2504 to £3627 per annum.

The Programmer will also report through the Systems Analyst to the Data Processing Manager. Applicants should have two years relevant programming experience at least one year of which should be in COBOL. Experience of assembler programming would be an advantage. Salary will be in accordance with the Other Related 10 scale — £2094 to £4011 per annum.

Application forms for both posts are available from Mr. A. G. Rees, Administrative Assistant, Staffing Department, The University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET, quoting reference number G/022/CW

ANGLIAN D.P. SERVICES LTD

POTENTIAL PROJECT LEADERS

Are you ready to take responsibility for the analysis and design of major systems in the financial teleprocessing developments of our client in Norwich? If your proven experience includes similar development on IBM 370 hardware that's fine, but a good education plus the character and personality to communicate effectively with all levels of management are equally important.

Systems Analysts with equal abilities but less extensive experience on any hardware, also excellent opportunities to join the project teams now and progress to future leadership positions.

This client expects high qualities in its staff but equally offers high quality of employment in return.

Ring: Bryan Richmond, 0603 887233 at any time (or leave anephone message) or write: East Anglian Systems Ltd., P.O. Box 70, Norwich NR1 4EP.

UNIVERSITY OF STRATHCLYDE

Applications are invited for a

RESEARCH FELLOWSHIP (PROGRAMMER)

in the ARCHITECTURE AND BUILDING AIDS COMPUTER UNIT, STRATHCLYDE (ABACUS) in the DEPARTMENT OF ARCHITECTURE AND BUILDING SCIENCE. The Unit is engaged in research and development of applications software for the architectural and building professions.
Candidates should possess a degree or equivalent qualification. Experience in the development of CAD Software (FORTRAN) particularly on DEC 10 and/or DG NOVA computers, and in graphics, would be of considerable advantage.
Appointment initially until 28th February, 1981. Commencing salary within the scale £3,781 / £4,407 per annum on range 1A of the national salary structure for research staff, existing vacancies still with placing according to qualifications and experience.
Further particulars and application forms (quoting R14/77/), may be obtained from Professor T.I. Willis, Department of Architecture and Building Science, Ahstrom Building, 131 Rottenrow, Glasgow G4 0NG, to whom applications should be returned by 4th October, 1977.

MANCHESTER

ANALYST/PROGRAMMER DP SUPERVISOR

SALARY NEGOTIABLE

We are retained to recruit a data processing professional for our clients, a public Company specialising in high technology products to the transport industry. The successful candidate will take complete control of a small data processing department utilising Burroughs B700 hardware. Duties will include systems development, programming, tuning and control of operations/data preparation.

Our clients require:—
* a proven track record in systems/programming
* Burroughs experience (preferred)
* an understanding of small machine operations
* good man management skills
* the ability to communicate fluently and liaise at all levels.

Our clients offer excellent benefits including: an above average pension scheme and relocation expenses by negotiation.

CONTACT DAVID WADE 061-833 0676 REF. 77/09/3

SPECIALIST COMPUTER RECRUITMENT LTD.
BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD
LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

Computing Services Association

SCR

PROGRAMMER

We have a vacancy for a programmer to assist with the maintenance and development of systems operating on our IBM System/3. Although preference will be given to those with RPG II, experienced programmers with other languages will be considered.

The work is both interesting and challenging, and the environment friendly and professional. There is scope for personal development and the opportunity to make full use of one's abilities.

The Company is the largest independent company in the poultry production and processing industry.

The Head Office is situated in a pleasant rural area.

Application forms available from:
Group Personnel Manager
G. W. Padley Limited
Anwick, Sleaford, Lincs.

University of Wales University College of Swansea

Senior Computer Operator

Applications are invited from experienced operators for the vacancy of Senior Computer Operator in the Computer Centre. The successful applicant will work under the direction of a Shift Leader on an ICL 1904S Computer, operating on a 24-hour three-shift cycle.
The salary will be on the scale £2,900-£3,434 per annum, together with a shift allowance of £370 per annum.
Application forms may be obtained from the Personnel Officer, University College of Swansea, Singleton Park, Swansea SA2 8PP, to whom they should be returned by 30th September, 1977.

WATERFORD REGIONAL TECHNICAL COLLEGE

City of Waterford Vocational Education Committee

Applications are invited from suitably qualified candidates for the following permanent whole-time lecturing post:

LECTURER I/ASSISTANT LECTURER
in Computer Science.

Experience of programming in Cobol and RPG is desirable

QUALIFICATIONS:
Qualifications in accordance with the Regulations of the Department of Education.

SALARY SCALES:
LECTURER I
Married: £5,090-£5,803 (11 point scale)
Single: £4,944-£5,593 (11 point scale)
ASSISTANT LECTURER
Married: £4,474-£6,273 (11 point scale)
Single: £4,434-£6,087 (11 point scale)
Children's Allowances and Degree Allowances are payable where applicable.

Application forms and further details may be obtained from Mr. M. H. Griffin, Personnel Registrar, Technical College, Cork Road, Waterford.

The closing date for receipt of completed application forms is THURSDAY, 6th OCTOBER, 1977.

Canvassing — direct or indirect — will disqualify.

Dated: 9th September, 1977.

Miss N. LANGFORD
Secretary/Chief Executive Officer

London Borough of Enfield

Programmer

£3,894-£4,072

Applications are invited for this vacancy in the Borough Treasurer's Department. Applicants should have at least 1 year's programming experience, preferably with ICL

The Borough's computer installation currently consists of a 64K ICL 1902 T and is developing 2902 [illegible] systems.

Application forms are obtainable [illegible] S.A.E. (foolscap), from the Borough Treasurer, Box 64, Civic Centre, Silver Street, Enfield, Middx. Closing date 7th October, 1977. Please quote reference ORA/B.

SPL INTERNATIONAL

For as long as there has been a UK Software Industry, SPL has been known as the Company that makes computer systems work: we have completed over 1,000 projects throughout the world and covered almost every aspect of computing including:

★ **Control and automation for industry**
★ **Distributed processing for commerce**
★ **Compiler and operating systems for DP manufacturers**
★ **Telecommunication networks for banks**

Our hallmark is the delivery of the goods and our standards and methodology reflect this. Our most important asset is the intelligence, expertise and adaptability of our staff. We are looking for more professionals to join us.

BASIC SOFTWARE

Our Basic Software Division needs people at all levels – technical managers, innovators, designers and programmers. You must have good experience in one or more of the following:

★ **Language design**
★ **Compiler/Assembler writing**
★ **Operating Systems**
★ **Filing Systems**
★ **Linkers/Loaders**

You will be based in London or Nottingham. Some of the work will be done entirely overseas : other projects may be for overseas clients but executed mainly in the UK.

To discuss these opportunities contact:

Alan Taylor,
SPL International,
12-14 Windmill Street,
London W1P 1HF.
Tel: 01-636 7833

or

John Guast,
SPL International,
25 St. James Street,
Nottingham.
Tel: 0602 45011

SPL INTERNATIONAL

London · Nottingham · Manchester · Paris · Brussels · Frankfurt · Milan · Stockholm · Helsinki · Madrid · Amsterdam

ATV

Real Time, Database

Unusual opportunity to learn REAL TIME and DATABASE techniques and to work in a lively environment in the West End of London (near Marble Arch) — ideal for people who can:

- *think on their feet and solve problems quickly*
- *interface with a variety of users — from Directors to clerks*
- *work to tight deadlines.*

If you are looking for a stimulating, challenging post where you can learn and progress, this could well be it. Current openings are for:

ANALYST/PROGRAMMER
c. £4,750

Have you an outgoing personality, good appearance and speech? Plus initiative, flexibility and the ability to work at senior levels? You should have had sound commercial experience (any language, any hardware), and Real Time experience would be valuable, but not essential. MUMPS training will be given. (Ref. 131.)

PROGRAMMER
c. £3,500

Sound RPG experience is essential (any hardware) and MUMPS training will be given. Graduates with industrial experience will be considered. Personality factors are important — you will be working with users; this is NOT A DESK-BOUND JOB. (Ref. 130.)

We have been retained by ATV Management Services Ltd. to advise on these extremely interesting career openings, and we would be glad to tell you more. Please ring us for an initial confidential discussion, or write briefly quoting the appropriate reference.

Tel: 01-637 5796

EDP Systems
52-53 Margaret Street
London W1N 7FF

Opportunities in Australia

Project Managers/Senior Consultants
Senior Systems Analysts
Analyst/Programmers

up to $A12,000-18,000

logica

Logica is one of the world's leading software, systems and consulting companies with 500 staff and offices in Europe, America and Australasia. Our local Australian office is in Sydney and we have clients drawn from major private and Government computer users. Our reputation is that of one of the highest quality consultancies in Australia.

Our immediate requirement is for Project Managers, Senior Consultants, Senior Systems Analysts and Analyst Programmers to work with advanced on-line commercial systems, for mini computers and dedicated small mainframes. Successful applicants will be based in Australia permanently or, on 2-3 year assignments. Logica will bear the cost of air passage and relocation expenses for successful applicants and their families.

Applicants must have a proven record of achievement in their field, and be ambitious, self motivated and flexible in their approach to work : previous experience with both mini-computers or mainframes working in an on-line environment with a range of languages. A degree or equivalent is desirable but not essential.

In our fast growing company, career prospects are excellent with opportunities to work on a wide range of projects. Salaries and fringe benefits will be attractive and if you want to travel, assignments outside Australia in the Logica group can be arranged for the right candidate.

Write with brief career details, using Freepost, or telephone for an application form to the
Personnel Department
Logica Limited
Freepost
PO Box 4SE
64 Newman Street
London W1A 4SE
telephone 01-637 9111

Basingstoke District Council

Computer Programmer

£3366 per annum - £4095 per annum plus approximately £496 per annum supplements.

A further vacancy has occurred in the Finance Department for a Computer Programmer to work on an ICL 2904 32K installation with 2-EDS 60 and 4 tapes.

Preference will be given to candidates with good experience of COBOL JCL/GEORGE IS and Find II, and of ICL software.

Commencing salary, within the scale, will depend upon experience. Housing accommodation may be available and assistance with removal costs will be given if required.

For an application form returnable by 3rd October, 1977, please telephone Basingstoke 56222 Ext. 207, or write to: The Personnel Manager, Basingstoke District Council, Civic Offices, London Road, Basingstoke, Hants RG21 2AJ.

Stone Executive

SNR. ANALYST
NORWICH to £5500
Previous proven exp. of CICS / VS 7 DL1. Financial environment. Excellent prospects — relocation assistance. (Ref. 3871.)

SNR. PROG.
N.E. ESSEX £5000
Min. 2 yrs. exp. IBM/COBOL under DOS (opt. some supervisory exp. — prof. financial or insurance trade preferred). (Ref. 3884.)

ANALYST
N.E. ESSEX c £5000
Min. 2 yrs. exp. preferably in ASSEMBLER on PC1, or COBOL & ASSEMBLER (Ref. 3916.)

SYSTEMS PROG.
ESSEX c £6000
Exp. in DOS ASSEMBLER desiring move into Systems Prog. to work near London, Essex border. (Ref. 3910)

0206-61261

CONTRACT OPERATORS

4 GEORGE 3 OPS URGENT!
6 GEORGE 2 OPS OCT. 10th

As well as the above positions we need 2900 VMEB and VMEK Ops and 1900 Data Control Clerks, VDU Operators and IBM SYSTEM 3 Operators for a variety of urgent and forthcoming contracts.

Phone 01-439 6481 NOW
(24 HOURS)

Licensed to Recruit

EFFECTIA GRAVIS
Personnel Consultants
01-439 6481
Bedford House
69 Aldwych Street
London WC2B 4JF

The Research and Statistics Group of the Inner London Education Authority
requires a

SENIOR PROGRAMMER

(PROFESSIONAL B)

to work on a number of major applications in the field of education statistics.
Applicants must have had several years' experience of FORTRAN programming preferably in an IBM 360/370 environment, and should be accustomed to handling large and complex databases. Acquaintance with CRJE and SPSS would be an advantage.
The successful candidate will be expected to provide assistance and advice to less experienced staff, and will need to be able to communicate with researchers, statisticians and administrators.
Salary Scale £4,442.80 - £6,068.80 (inclusive of London Weighting and Phase 1 and 2 Supplements).
Details and application forms from the Education Officer (EO / Estab. 24/1), Addington Street Annexe, The County Hall, London SE1 7PB. Please enclose a stamped addressed envelope.
Forms to be returned by 7th October, 1977.

MAJOR NEW DEVELOPMENT FOR AN INTERNATIONAL ORGANISATION

Centre'file is one of the leading computer bureaux in the U.K. currently providing services to some 2,500 industrial and commercial organisations, many of which are household names.

We have recently acquired a major contract to redesign The Diners Club Credit Card System and as a result require additional programming and systems staff to supplement our existing research and development team. The new system will incorporate New Data Preparation techniques and Software suite operated on our IBM 370/155 equipment.

Our requirements are as follows.

SENIOR SYSTEMS ANALYST

Salary range £8320-£8400

This is a senior appointment, reporting to the Project Supervisor requiring a highly-motivated 'self-starter'.
Applicants should have a Cobol programming background and at least two years' systems design experience. Responsibilities will include the specification and control of a wide range of hardware together with the overall monitoring of the day-to-day progress of the development team.

COBOL PROGRAMMERS

Salary range £3100-£5320

Vacancies exist within the Research and Development team for Cobol Programmers. Salary will depend upon experience however applicants should have a minimum of 18 months applications experience.
An attractive range of fringe benefits are applicable to all positions and applications should be made in writing to John Masterson, Personnel Manager, Centre-file Ltd., Bowater House, 18-22 Furnival Street, London EC4A 1JU.

A member of the National Westminster Bank Group

COMPUTER OPERATOR

(male or female)

required for a sophisticated satellite computer system in pleasant academic surroundings. Previous experience preferred, but not essential. Starting salary in range £2142 p.a. rising to £3084 p.a. plus an allowance of approximately £340 for two shift working. 4 weeks' holiday, pension, mutation scheme.
Apply in writing with full details to: Computing Manager, King's College, London, Strand WC2R 2LS.

OPERATOR

We are a computer service bureau based within 5 minutes of the City. Clients are mainly in the advertising industry. At present we have a Junior Operator on a 1900 machine and would like to hear from anyone who has had some experience with computers and is looking for a career with opportunities for progression. The salary will be negotiable according to experience and ability. Please write in the first instance to:

COMPUTER ANALYST/PROGRAMMER

Newcastle upon Tyne Up to £5007

British Gas at the Mathematics and Computing Department, Engineering Research Station, Killingworth, require a computer analyst/programmer.

The duties are to maintain and develop scientific computing facilities for use in processing pipeline inspection data. The work includes systems and applications programming, hardware and software evaluation, providing advice and assistance to in-house users, and setting up an operational service to the Industry. The present computer configuration is a PDP 11/45 running RSX-11M.

You should have a degree or equivalent qualification plus computer programming experience including assembler-level language (preferably MACRO) and FORTRAN experience.

A requirement to work non-standard hours may arise and, when applicable, additional allowances are payable.

The salary is within the range £3777-£4695 plus £312 Flat Rate Supplement. Initial placing, according to age, qualifications and experience.

Please write for an application form, quoting reference ERS/803908, to the Senior Personnel Officer (R&D), British Gas,
39 Bryanston Street,
London W1A 2AZ.

Closing date for applications 6 October 1977.

BRITISH GAS

Tutor Computer Training Centre

£5278-£6800 p.a. inc.

Applicants should have
- Five years experience in computing – at least two working with IBM machines, ideally in an Operating System environment.
- A good knowledge of IBM Job Control Language, Cobol and/or Fortran.
- The ability to communicate easily with all levels of staff (teaching experience would be an advantage but is not essential).

The job will involve
- Teaching on courses given by the Centre.
- Preparing course notes and training manuals.
- Writing and testing programmes.
- Participating in the review of existing courses and the development of new ones.

The Training Centre, located at our Headquarters in London, is primarily concerned with running courses for our own staff, but certain courses are open to outside users. Courses have been developed for all levels of staff involved with computer programming, operating and applications. Some appreciation courses are also held.

Applications stating full relevant details and present salary to the Group Personnel Officer, CENTRAL ELECTRICITY GENERATING BOARD, Sudbury House, 15 Newgate Street, London EC1A 7AU, by **October 6, 1977.** Quote Ref. **DT/261.**

DIRECTORATE OF ADMINISTRATION
Computer Unit

Systems and Programming Staff for ICL 2970

All Grades from Grade 3 (£3,230 p.a. min.) to Grade 8 (£6,142 p.a. max.)

Increases in demand for access to computer facilities and for computer services had led to the installation of an ICL 2970 computer with an extensive telecommunications network of RJES and VDUS. With the planned development workload the system will be progressively enhanced to become a 2M BYTE machine with 3800M of on-line storage by the end of 1979.
The expansion of the unit and its sphere of activity means that vacancies have arisen for all levels of systems and programming staff in the section of the computer unit concerned with the development of computer systems in both financial and water management applications' area. Applicants, male or female, must have a proven record of data processing in the areas of programming, system design or implementation.
Graduates will be considered for posts of Trainee Programmer.
Experience in a similar environment would be an advantage although training will be given where relevant.
Relocation forms and job descriptions (state area of work preferred) may be obtained from: The Computer Manager, Anston House, 137/139, Preston Road, Brighton, Sussex BN1 6AF. (Tel. Brighton (0273) 507101 Ext. 205). All application forms must be received by 6th October, 1977.

Southern Water

The UK Division of CAP/Gemini/Sogeti Product Marketing Company wish to appoint experienced and professional

PRODUCT SALESMEN

UK, London based **£6,500-£12,000**

The products involved are:

1 SYSTEM 2000

For this you must have
- ★ a minimum of 5 years in DP
- ★ 360/370 OS implementation, development or support experience
- ★ Mobility

2 MULTIFASTER, SYSIF, SYNCSORT, OPTIMISER II, PLAN 1V

For these products you need
- ★ a proven sales record in the service industry
- ★ experience of IBM installations, preferably OS

For full details please ring Jenny Dalrymple-Hay on 01-493 2947 or Beaconsfield (04946) 4578

ANALYST/PROGRAMMER

salary £5000-£6000 + COMPANY CAR

Join a dynamic Midlands company marketing DEC and other minicomputers on a turnkey basis.
We seek to recruit a person with considerable experience in commercial applications. Pre-Sales work is an important part of the job — some experience of this, or plenty of enthusiasm, will be needed.
We provide a company car, pension, insurance and bonus scheme.

For the Job Specification, contact Andrew Reeves, Managing Director: 021-236 5234. (2 p.m.-7 p.m.)

While ten men wait for something to turn up one man turns something up.

We really believe that the independence we give our Field Service Engineers helps them to make the most of the challenge provided by the world leaders in mini-computers.

Right now, we are looking for FIELD SERVICE ENGINEERS to work on our highly successful LARGE DEC SYSTEMS 10 AND 20. We have opportunities in Dundee, London, Malvern, Farnborough and Oxford for men and women with HNC/HND in electrical/electronic engineering with a minimum of two years' relevant experience on mainframe installations. Comprehensive training in hardware and software will equip you to make the most of your job. Career advancement opportunities are naturally first class since we ensure that promotion is given to people with proven ability and ambition.

The salary is excellent, together with the fringe benefit package associated with an international organisation like Digital, including relocation assistance where appropriate.

If you believe that you are the type of person we are looking for contact: Ken Lanham, Personnel Department, Digital Equipment Co. Ltd., Fountain House, The Butts Centre, Reading RG1 7QN Telephone: Reading 599049 quoting CW328.

digital

UNIVERSITY OF SOUTHAMPTON

COMPUTING SERVICE

Applications are invited to fill posts of.

PROGRAMMER

to join a team providing support on the University's IC 2970 computer.

Applicants should have some experience in programming in a high level language on a very large scale system. Knowledge and experience of a multi-access operating system such as TSS/360 or GEORGE 3 is highly desirable. Some experience in use of data bases would be an advantage. Starting salary according to qualifications and experience within the scale £2,904-£4,617 or for an exceptionally experienced person exceptionally £5,627. (ref: 77/80/CW)

and for

COMPILER SUPPORT PROGRAMMER

to be responsible for the support and maintenance of a PASCAL compiler for the 2900 series currently being developed on the University's 2970 machine.

Applicants should have some experience of this technique and a high level language compiler design and construction in a time sharing operating systems. A knowledge of the PASCAL language or the ICL 2900 series computer would be desirable but not essential.

The post will be tenable initially for a 3-year period. Starting salary according to qualifications and experience within the scale £3,333-£6,827. (Ref: 77/80/CW).

Further particulars of the above posts may be obtained from Mr A. J. Small (Southampton 559122 Ext. 3884) to whom applications (4 copies) giving a curriculum vitae of the names and addresses of two referees should be sent to the University of Southampton, Highfield, Southampton SO9 5NH, not later than 5 September, 1977. Please quote appropriate reference number.

SENIOR SALESMAN EIRE

SMALL BUSINESS SYSTEMS to £10K

As the Irish distributor for Europe's largest manufacturer of small business machines, they are established as market leader. Their products are highly advanced, exceptionally cost effective, and are constantly upgraded to stay ahead. The local support team is excellent, and can call upon fast and effective back-up from Europe.

This requirement for a Senior Sales Executive has arisen by a combination of fast market growth and release of more new products. The right person will be developed quickly towards a management position and will lead the sales team forward to even more success.

Candidates should be able to demonstrate a good track record with experience of small business systems, minis, VRC, etc. They must be sales professionals able to understand the business objectives of users and perform at Board Level.

This is an opportunity to develop your sales career in a small dynamic Company but still backed by the product breadth, R & D, and technical support of a major manufacturer.

RW 38/1

MESSAGE SWITCHING & COMMUNICATIONS

SALES -£10,000+ AND CAR

This company has established itself as a major force in the market for message switching systems and other communications products. Backed by an efficient support organisation, the products are unrivalled in capabilities and price/performance. The company has thus secured an enviable share of the market and established an outstanding blue-chip customer base, which is growing rapidly. The company's name and reputation are well known throughout the industry, reflecting its very considerable achievements.

The growth of the business has created new sales opportunities throughout the UK and abroad, to exploit one of the fastest expanding markets in the world. It is a dynamic environment which will appeal to ambitious salesmen who wish to influence management decisions. Career advancement will be as fast as the individual's skills will allow.

Managing named accounts or geographical territories, each sales executive will have a successful track record of practical sales experience in communications-based environments.

Candidates must be professional, self-motivating sales executives, with the experience and ability to negotiate at Board level. Knowledge of message switching applications and/or communications networks is advantageous.

Rewards will be by way of high basic salary and commission to produce incomes in excess of £10,000 p.a. Company cars will be provided and there are excellent fringe benefits.

RW 38/2

CONSULTANCY

CENTRAL LONDON BASED, OVERSEAS TRAVEL OPPORTUNITIES

INTERNATIONAL MARKETING UK Salary £8,000 + Generous O/S Allowances

This top flight British consultancy seeks a person to develop more business in the Middle East.

After developing marketing plans covering a range of consultancy services, the successful applicant will be involved in extensive travel to achieve sales targets. As an experienced person will know, success demands all the traditional sales qualities, plus plenty of patience and resilience. Naturally the rewards reflect the skill required; career prospects within this large consulting group are unlimited.

RW 38/4

TELECOMMS CONSULTANTS c £6,500

Are you looking for an alternative to the traditional telecommunications environment? As a consultant in this expanding department, you will be asked to participate in a wide variety of assignments for UK and Overseas clients. Using your extensive practical experience, you will continue to enhance our client's reputation whilst simultaneously broadening your career within and beyond the telecomms field.

RW 38/5

EDUCATION To £5,000

The "chalk and talk" approach to the teaching of d.p. staff, while not indispensable, is now supplemented by a variety of techniques. Our client is a leading manufacturer of computer systems and they are justifiably proud of the systems they have developed and use for computer-assisted management of learning.

Would you like to make the fruits of your experience available to others? Can you appreciate that special satisfaction that comes from seeing students extending their knowledge and broadening their skills?

If you have one or two years' programming/systems experience and would like to work in a training environment in LONDON contact us now.

There are also the possibilities of more peripatetic roles, providing local educational support, in the NORTH WEST and on the SOUTH COAST.

RW 38/3

hutchinson-scoggins recruitment

10 Dover Street, London W1X 3PH Telephone 01-499 4501

Computer Programmer

Bostrom Division of UOP Limited is the world's leading manufacturer of suspension seating for the truck, tractor and industrial equipment markets.

We are currently seeking an experienced programmer to join our small but expanding D.P. installation, which utilises an IBM System 3, Model 12.

The successful applicant will have a minimum of three years' programming experience, using RPG II, and will probably have worked in a manufacturing environment.

Commencing salary will be dependant upon age and experience, and the company offers a wide range of benefits, including 28 days' annual holiday and contributory pension scheme with free life assurance benefit.

In first instance, please write or telephone for an application form to:

Mrs. P. Cowgill
Personnel Officer
Bostrom Division
UOP Ltd.
Weedon Road Industrial Estate,
Northampton, Tel: (0604) 58621.

UOP

COMPUTER MANAGER

NORTH LONDON (N.18)
UP TO £4,000 p.a.

The job: to supervise a new mini computer installation consisting of a Nixdorf 8835 processor with console, one split disc unit, line printer and 2 full time operators.

The person: ideally an ambitious young Operator or Programmer educated to at least 'A' level standard wishing to make their first move into computer management.

The company: a private company with approx. 300 employees manufacturing a wide range of food products.

How to apply: Phone or write for application form to Mr R. J. Ashby, Company Secretary, Rayner Co. Ltd., Commercial Road, Edmonton, N.18. Tel. No. 01-807 3080.

PROGRAMMERS

Experienced minicomputer professionals required on our own applications.

Preferably with DEC experience. Contracts for at least 4 months. £150-£180 weekly. No Agencies. 01-398 7346.

UNITED KINGDOM ATOMIC ENERGY AUTHORITY
Northern Division

COMPUTER PROGRAMMER

A requirement for a Computer Programmer has arisen in the Computer Section at Windscale Nuclear Power Development Laboratories, Cumbria. The Section will shortly be basing its computing services on an ICL 2980 supporting both RJE and interactive terminals and this post will provide an opportunity for the selected applicant to acquire experience in Systems Analysis and in the writing of data bank software.

Qualifications and experience

Applicants (male or female) must possess a Higher National Certificate or Diploma in a scientific, engineering or mathematical subject, or an equivalent qualification. The languages used are COBOL and FORTRAN; familiarity with ICL or IBM operating systems is desirable but not essential.

Terms of appointment

Appointment will be to the Scientific Officer grade with salary within the range £2,300-£3,775 per annum. In addition the following supplements are payable:

(i) a supplement of £313.20 per annum
(ii) a supplement of 5% of total earnings (subject to a minimum of £10.88 per month and a maximum of £17.40 per month)

Excellent service conditions include 20 days annual holidays and other benefits appropriate to a staff appointment.

For application form please write or telephone — quoting reference S906/J170, to:

Staff Officer, Windscale Nuclear Power Development Laboratories, Windscale Works, Seascale, Sellafield, Cumbria CA20 1PG. Tel: Seascale 333 Ext. 405.

Closing date for receipt of completed application forms is 7 October, 1977.

Make your future with **UKAEA**

Real-Time—Health Care

The London Hospital Computer Centre is developing and supporting real-time computer services to improve patient health care. The hardware includes a communications network of 70 terminals in wards, laboratories, and administrative offices, and is based on 2 Unix minicomputers. Laboratory equipment is interfaced to the mainframe through mini-computers.

Intermediate Operator
£4,133-£5,185 fully inclusive

Applicants will have a minimum of 2 years Operator's experience

Basic Operator
£3,486-£4,133 fully inclusive

Applicants will have successfully completed a period as a trainee operator or have previous experience on comparable equipment.

Staff facilities on site include a sports and social club, squash and tennis courts, swimming pool, staff restaurant and a library. Temporary single accommodation may be available. Season ticket loan scheme.

For application forms and job description ring 01-247 5454, ext. 388, applications to be returned to Miss Woodeson, Personnel Services, The London Hospital (Whitechapel), London E1 1BB.

The London Hospital

Tower Hamlets Health District — part of the City and East London AHA (Teaching)

Urgently required in many areas:
CONTRACT COBOL PROGRAMMERS
for IBM, ICL and UNIVAC

Compex

Promotional Opportunities

The fulfillment of a long term planned expansion programme has resulted in our client wishing to recruit the following additional personnel for its IBM installation in CENTRAL LONDON. Further plans are also at an advanced stage that will augment the present configuration by the introduction of DEC PDP equipment,which will be used extensively for teleprocessing.

Chief Programmer up to £6000

To take direct charge of a small team of programmers, the person we are seeking should have a minimum of four years experience of IBM COBOL under DOS or OS. A knowledge of DEC teleprocessing equipment would be an added advantage. The job would particularly appeal to a person looking for the opportunity of a management position while at the same time maintaining a high degree of technical and practical programming involvement.

Programmer Analysts c£5000

Reporting to the Chief Programmer, the position requires a person who prefers a programming bias to their job content. However, in view of the heavy commitment to new projects, applicants should be prepared for a certain amount of associated analysis work.

Experience of COBOL, under either DOS or OS, are essential technical requirements.

Both positions carry the usual benefits associated with a member of a large public group of companies.

MAYFAIR CW36/1

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Computing Services Association

BOOKS

Programming principles and methods

Current trends in programming methodology, Volume 1: Software specification and design, edited by Raymond T. Yeh. 320pp. £13.55. Prentice-Hall International.

IN the words of the editor, "The purpose of this series in programming methodology is intended to bring together a collection of tutorial papers in each volume . . . this first volume is to survey recent developments of programming principles and techniques for the systematic design of well-structured and reliable software architecture."

It includes papers on formal specification of data abstraction; the relationship between programming languages and program structure; a methodology for the design, implementation and proof of large software systems; software structure and reliability; the development of large reliable programs; a discussion on the use of GO TO statements and structured programs; a design methodology for fault-tolerant software; control — record — driven processing; and, finally, guarded commands, nondeterminacy and formal derivation of programs.

Mr Yeh's objective appears to have been to produce a book which can be used as a textbook by students of computer science and as a reference book by established computer professionals.

In my opinion he has succeeded in the first part of his objective and produced a textbook which will prove useful to students of computer science for several years to come. It is also my opinion that Mr Yeh has, at least partially, failed in the second part of his objective.

Some of the papers are very well written and therefore make interesting reading, but the majority make very heavy reading and are likely to cause the average reader to lose interest, which is a pity. It is the average data processing "professional" who should read and absorb the information contained in this book, so that they may understand some of the revolutionary changes taking place today in the field of software development. I would therefore recommend this book as useful reading matter only if you are willing to read on to the bitter end.

R. C. BROWN

Six high-level languages benchmarked

Programming Languages, Allen B. Tucker. 439pp. McGraw-Hill.

FOR as long as there are degree courses in computer science there will be a market for books like this which help to complicate the field of computers. Six languages are compared and their points of difference are, yet again, accentuated. When, oh when, will someone write a book which accentuates their points of similarity and blow the computer language myth once and for all?

Tucker's work is by no means as bad as some, but there is almost no mention at all of the underlying similarities running through all programming languages. Just one or two pages on this topic would earn a measure of redemption and lift any book out of the morass of trivia and suggest to some readers a path towards a new, simplifying approach.

Here we have a book, written for students of computer science, comparing six programming languages — but not one assembler language is included. The original reason for developing high-level languages was so that the layman could write his own programs. But the layman has clearly shown that he isn't interested, so we now have droves and droves of high-level programmers brought up on books like Tucker's, heavering away without realising that "high-level" is merely a skilfully marketed euphemism for "inefficient"

As a conventional comparison of six high-level languages, the book meets its objectives. Indeed, it could even be said to justify the claim made in the preface that "this text attempts to unify the study of programming language principles with the study of programming language applications".

However, the second axis of unification — i.e. between different languages, has been completely missed. Each language has been dealt with in isolation from the others — each "language island" has been kept in its fossilised, discrete state — all divisions have been preserved. In the introduction to the chapter on PL/1, its origins in Algol, Cobol and Fortran are mentioned but little reference, if any, is made in the body of the chapter to illustrate this point.

On the whole, for anyone who wishes to study a comparison of benchmarks using high-level languages on a variety of machines, this book must be useful. The book certainly seems to achieve what it sets out to do, but left me with the feeling that it was based on superficialities and was in no way relevant to the fundamental problems of our computer-using society.

DICK HALES

Lucid within its limits

Information retrieval and the computer, by Dr Christopher D. Paice. 200pp. £5.95. No 26 in Macdonald and Jane's Computer Monographs series.

THIS is one of those monographs which are based on notes for a university lecture course, "put into a presentable form," and offered as a general introduction to the subject. The trouble with this approach is that a thoroughly worthy treatment aimed at a very specific consumer may be labelled with a title and a publisher's blurb which lead the general reader to expect something very different from what he gets.

It is, for example, rather disturbing to find a volume published under the title, information retrieval and the computer, which includes no discussion of the economics of computer-based information retrieval; which deals only briefly with online systems and not at all with the user-system interface; which refers to only three operational databases and no operational retrieval systems and which — on page 1 — assumes that it is a requirement for a computer-based information retrieval system that "there is no middle-man" and the "ordinary user" should be able to enter his own request: when all experience shows that even with the recent rapid growth in the use of online retrieval systems some 80% of usage is made via "middle-men" (albeit information specialists rather than computer specialists).

What the book does provide is a general introduction, for computer scientists, to the terminology and techniques of librarianship and information science, and to some of the basic computer methods which are applicable in this field. The author also surveys academic research in such areas as automatic classification and automatic sentence extraction.

Within the limitations of its coverage, the book is lucidly written, terminology is clearly defined, and there are references for further reading. But it is doubly depressing to find such a restricted view being offered under so broad a title, and — if the content can be taken as representative — to feel that a computer science course in this exciting application area can be so remote from what is happening outside.

DAVID MARTIN

Brochure

A 20-PAGE colour booklet on static uninterruptible power supply systems is now available from Chloride Transipack. It covers systems in the power range 30 to 600kVA, suitable for process control, computing, communications and other applications. Copies may be had from Chloride Transipack Ltd., Stanley Road, Bromley, Kent BR2 9JF. Tel: 01-460 9861/5.

Data processing well explained

Introduction to computer data processing, by Wilson T. Price. 500pp. £12.50 Dryden Press.

THIS is an accurately titled book in that it genuinely introduces the reader to all those areas of work or study necessary to enable a beginner to understand data processing, from a feasibility study through systems analysis and design, to programming, operating systems, information codes, data processing machines and even a brief illustrated outline of the history of computing devices.

A practical approach is adopted; principles, techniques and details of equipment emerge largely in response to the needs of various case studies, and useful examples and exercises are a feature of the book. Human aspects are considered from the beginning, and on the technical side the reader is taken as far as indexed sequential files and the database concept.

Programming is introduced through a very simple simulated machine language and the elements of Basic, Fortran and Cobol, and each concept is very carefully explained. However, many readers would be dismayed by the unnecessary use of GOTO statements and exit from loops by means of a run-time error (p.257) or some kind of user interrupt (p.273 and 275). It is admitted that the chapter is far from a full discussion of Basic, but even so, FOR statements could easily have been introduced and used.

Ideally the simplified machine language might have demonstrated counters and conditional branching as a lead into FOR statements in the next chapter.

Magnetic tape and disc systems are very well treated with excellent diagrams and all the information one needs to get a firm grasp of the essentials. This second edition also mentions such things as floppy discs and microprocessors but it has not brought itself up to date on matters relating to program structure, perhaps because this would have required too fundamental a revision of material first published in 1972. There is an index and a useful glossary of terms.

There is a wealth of detail and teaching material in the book, and it is well written and beautifully presented — well up to the standard we have come to expect from US textbooks. It should be available in school and college libraries, and it would be particularly useful to many teachers in schools and colleges as a complementary book to the literature relevant to the programming and use of a particular computer system.

ROY ATHERTON

The name of the game

Machine Intelligence 8, edited by E. W. Elcock and Donald Michie. 830pp. £24. Ellis Horwood, distributed by John Wiley.

EVER since it ceased to be possible to be a Renaissance Man, a polymath who could encompass the whole of what Edinburgh used to call Natural Philosophy and the Humanities, those engaged in the pursuit of knowledge have been galloping off madly in all directions. All the determined individual could do was put his money on a likely looking horse and hope it led, if not to a winning post, at least past a furlong marker or two.

With the rapid development of the computer, two possibilities emerged: first, the horses could run even faster; second (and more important), the stewards could begin to keep track of events. From the latter arose the notion that it was again feasible to map, evaluate and to direct the headlong progress. That is, to know something of where the pursuit of knowledge was heading most successfully, to understand to a degree why some strategies paid off more handsomely, and to know the name of the game.

When the Machine Intelligence series began about 10 years ago, the discipline (if it was that) had, as the editors put it in the introduction to this volume, "a bad name and a disputed nature". They are today able to claim, "Now all this has been clarified. Not a single AI professional can be found who will not say that whatever this Protean field's name should be, its nature has at least been firmly established: the use of machines and machine-oriented formalism to study how knowledge may be represented, measured, transferred, and acquired de novo. This book constitutes the first integrated collection devoted to a theme which we now perceive to have been our proper business all along."

The book comprises a range of studies on "the unitary theme of knowledge-representation in its bearing on machine intelligence." It reviews theoretical and experimental insights in applications ranging over the fields of mathematical reasoning, deductive problem-solving, knowledge - measurement, inductive learning, programming, man-machine dialogue, descriptive methods in empirical science and the design of seeing and language - understanding machines.

The event which concentrated the minds of the distinguished contributors so wonderfully was a two-week NATO Advanced Study Institute held at Santa Cruz, at the University of California.

It is impossible for one person to evaluate the work reported. That is indeed, the nature of the game. But here you will find reports from the various fronts, set in their true context, by professionals speaking to professionals and advanced students in disciplines which include computer and information science, artificial intelligence, psychology, psycholinguistics, linguistics, philosophy (both natural and unnatural), bio-mathematics, neurology, bio-science and brain research.

At least the riders can now talk to each other (and where the daunting jargon permits, to the bewildered spectators). After 10 years of advance and consolidation, they are talking horse-sense. The combined bibliographies, not the least feature of this thoroughly planned volume, will, in the blurb's words, "put into the reader's hand the keys to virtually everything which is yet known in this subject." A formbook, at last.

DONALD MITCHELL

Computers in fiction

Inside Information: Computers in Fiction, by Abbe Mowshowitz. 345pp. £6.40. Addison-Wesley.

THE division between fact and fiction is not obvious any more, even to those who seek it.

This is because technology, computer technology in particular, has made the impossible less so — "miracles only take a little longer." This book seeks to outline the role of computers in this development.

Mowshowitz sets up a framework on which he pegs science-fiction stories, displaying themes of machine dominance, "living," "thinking" computers that become aware of themselves when a critical point is reached, friendly and neutral computers, even a computer that fulfils Man's destiny (the latter in Arthur C. Clarke's classic, "The Nine Billion Names of God").

And from this framework comes a clearer picture of how computers, or even just automation, will, or could, affect society as a whole.

Many statements of the past are now within the grasp of present-day society, or in the words of the author, "computerisation adds little that is new, apart from the specific technological means for implementing the schemes imagined by earlier Utopian writers."

Science fiction is the arena in which issues raised can be played out "bloodlessly and from which conclusions may be drawn.

However, the book does assume a certain admittedly not very high level of knowledge of the subject in the reader.

What is very clear is the closeness of these implications to the ordinary person, highlighting the need for a continual awareness of change.

The book is in eight main sections: a brief discussion of a particular topic, ie. The Clockwork Society, Control of Behaviour, etc followed by a selection of relevant science-fiction works by writers such as Robert Heinlein, Isaac Asimov, Robert Sheckley, Samuel R. Delany, and John Brunner.

This study-anthology hits many social issues right on the head and has a good annotated bibliography.

ROBIN WEBSTER

Software metrics: key to a fortune

Software Metrics, by Tom Gilb. 282pp. £11.15. Prentice-Hall International.

THIS book is dangerous — it could trigger off a revolution in computer-buying policies.

Worth reading for the foreword by Weinberg, even if you don't read anything else, this book is superb value for money. Used in the right way it could also be the key to a fortune. It will probably be either completely ignored or severely criticised by the pseudo-professionals, i.e. those with many years' "experience" which when analysed turns out to be one year's experience repeated many times.

However, the effect on those who can still think for themselves will be staggering. With or without degrees in computer science, with or without years of experience, people who have retained some intelligence, self-respect and integrity despite the vagaries of the computer business will read and discuss this book.

The book will help to crystallise opinion and form a focal point for constructive ideas on how to improve our industry.

In case the penny hasn't dropped, software metrics is a way of measuring the critical properties of computer applications, programs and data.

As Gilb puts it: "Metrics is the language we can use for precise matching of available techniques to the users' requirements . . . The same metric concepts can be used to specify what we want, to predict what we can expect to get, and to measure what we have gotten."

There is a well-known programmers' saying: "An elephant is merely a mouse with an IBM operating system."

Software Metrics will prove the validity of such remarks to large sections of our computer-using society. The effect will be startling — after all, it's the users who pay the bills.

DICK HALES

Puzzle answer

THE 16 moves are: 2-to-A, 1-A, 5-C, 1-C, 2-B, 1-B, 3-C, 1-A, 2-C, 1-C, 4-B, 1-B, 2-A, 1-A, 3-B.